the OIL AND GAS JOURNAL

PORTRAIT OF PRODUCTION

The production of 20 plants owned, partly owned or operated by Warren, plus the output of many other plants whose production is purchased and marketed by Warren, makes this company the largest natural gasoline marketing organization in the world.

WARREN PETROLEUM CORPORATION

Producers, Manufacturers, Exporters and Marketers

Export Terminals: Corpus Christi, Port Arthur, Baytown, Texas City, and Norsworthy, Houston, Texas.

TULSA 2 OKLAHOMA CABLE ADDRESSES: Stavolene, Warren

Crude Oil, Natural Gasoline and Liquefied Petroleum Products

PRICE 50 CENTS

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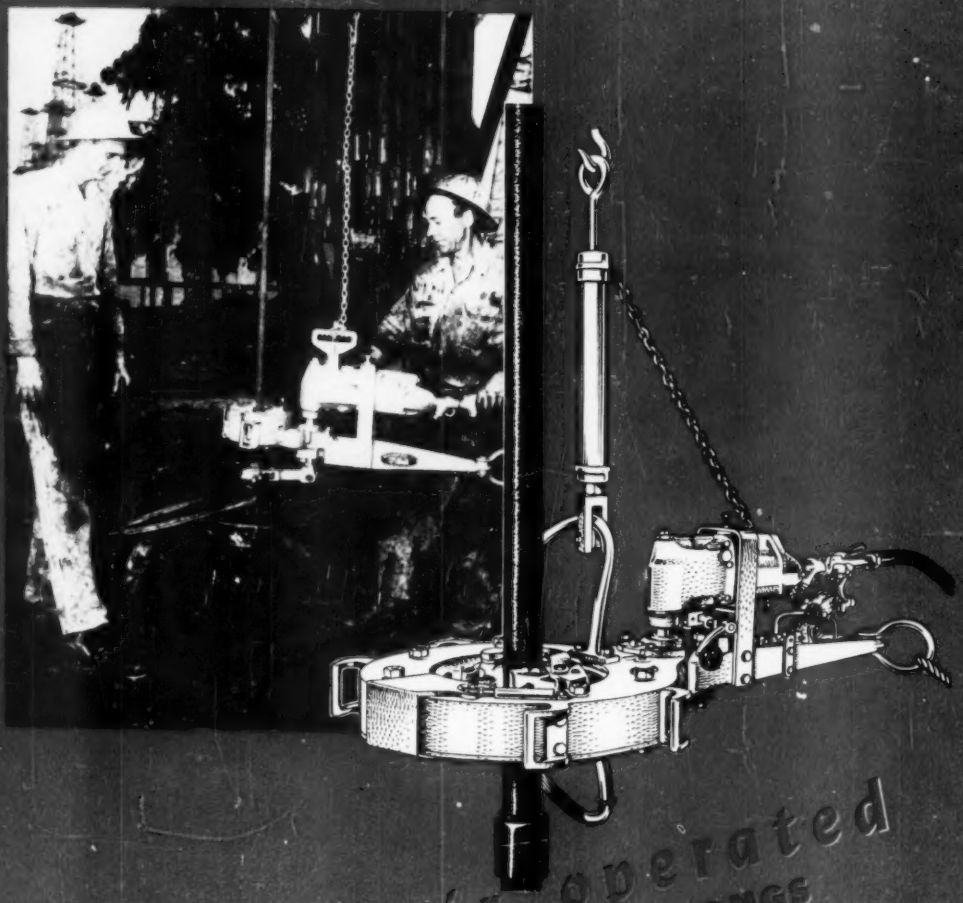
SEPTEMBER 29, 1949

HILLMAN-KELLEY



air operated
TUBING TONGS
and
SUCKER ROD WRENCHES
COMPRESSOR UNITS

MANUFACTURERS of

HILLMAN-KELLEY

HOME OFFICE — 1000 MACY STREET — LOS ANGELES 33, CALIFORNIA

HOUSTON TULSA LAFAYETTE, LA.

B7 STUDS

Carried in Stock

Refinery engineers can count on two things when they order B7 studs from Bethlehem: (1) Getting the sizes they need, and (2) Good delivery. This is because Bethlehem stocks B7 studs in all diameters and lengths used by oil refineries. As for the steel from which these studs are made, B7 has what it takes for dependable service at medium-high temperatures and pressures. A chromium-molybdenum steel (AISI 4140, 4142 or 4145), B7 conforms to the requirements of ASTM Specification A193-48T. It fulfills the following chemical and tensile requirements:

B7 – CHEMICAL REQUIREMENTS

	Range	Check Variation, Over or Under
Carbon, pct	0.38 to 0.48*	0.02
Manganese, pct	0.75 to 1.00	0.04
Phosphorus, max, pct	0.04	0.005 over
Sulphur, max, pct	0.04	0.005 over
Silicon, pct	0.20 to 0.35	0.02
Chromium, pct	0.80 to 1.10	0.05
Molybdenum, pct	0.15 to 0.25	0.02

**For sizes over 3½ in., and up to 4 in., inclusive, the carbon content may be 0.50 pct, max.*

B7 – TENSILE REQUIREMENTS

	Minimum Tempering Temperature F	Tensile Strength min., psi	Yield Point min., psi	Elongation in 2 in., min., pct	Reduction of area min., pct
Diameters 2½ in. and under	1000	135,000	115,000	15	50
	**1100	**125,000	**105,000	**16	**50
	1200	105,000	90,000	17	55
Diameters over 2½ in., and up to 4 in., inclusive	1000	125,000	105,000	15	50
	1100	115,000	95,000	16	50
	1200	105,000	85,000	17	50
Diameters over 4 in., and up to 7 in., inclusive	1000	110,000	85,000	16	45
	1100	100,000	75,000	18	50
	1200	90,000	65,000	20	50

***Properties in bold-face type represent standard heat-treatment to be given material as stocked for use under the specification as agreed by manufacturers.*

B7 is one of seven grades of steel being produced by Bethlehem for high-temperature, high-pressure fastenings. The others are: B7a, B14, BA, BB, BC, and A261—an all-inclusive range designed to meet virtually every need.

Bethlehem's plant at Lebanon, Pa., is well equipped for the manufacture of fastenings used by the oil industry. Our engineering staff is always at your service. Whenever you encounter a difficult bolting condition, get in touch with the nearest Bethlehem office, or drop us a line at Bethlehem, Pa. We'll be glad to hear from you at any time.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

Bethlehem supplies every type of Fastening

BETHLEHEM STEEL

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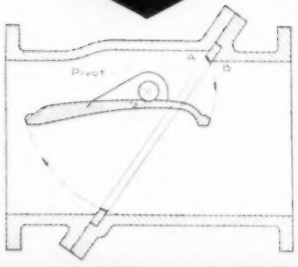
MAINTENANCE COSTS ARE LOWER

when you have *CUSHIONED CLOSING*

of—CHAPMAN CHECK (TILTING DISC) VALVES



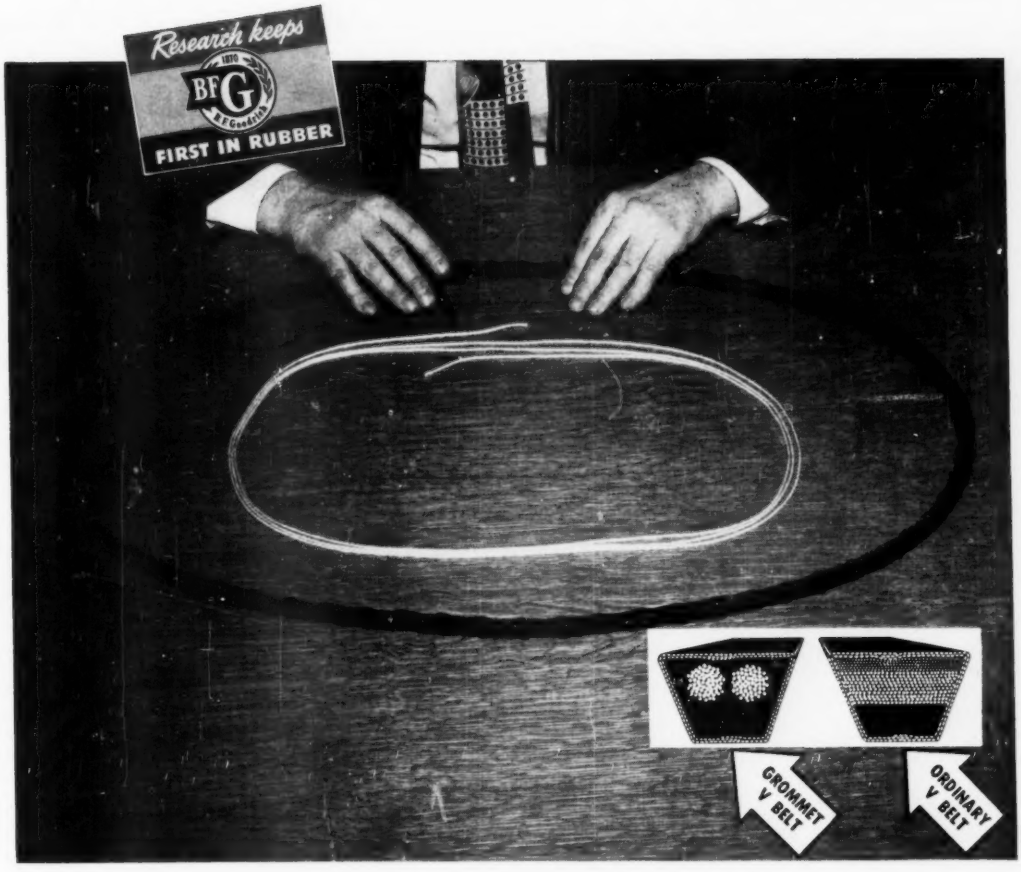
Cross-section of the Chapman Tilting Disc Check Valve illustrating the way that the balanced disc is supported on the pivot, with arrows showing the travel of the disc. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

That's right! Maintenance costs *are lower* with Chapman Check Valves . . lower because the balanced disc works *with the stream.* There's no slamming to cause destructive pipe line stresses and increase maintenance costs. Nor is there any rubbing on seats . . . the disc closes quickly and quietly with no sliding or wearing action.

Yet that's only half the story. Head losses are actually 65% to 80% lower than for conventional type check valves. And, when used on pump discharge lines, substantial power savings are possible.

Why not write today for engineering data and reports of tests.

THE CHAPMAN VALVE MFG. COMPANY
INDIAN ORCHARD, MASSACHUSETTS



What is this thing called a grommet?

New B. F. Goodrich grommet V belts cut costs 20 to 50%

No—a grommet is not an ordinary cable. It is a patented construction in which heavy cord is wound upon itself to form an endless loop. An ordinary cable is merely a twisted cord, the ends of which must be overlapped to make a loop. (See the picture above.) The difference is important to you, because a B. F. Goodrich grommet V belt delivers 20 to 50% more V belt value *at no extra cost.*

Grommet belts are more flexible—They have no splice, no stiff section where cords overlap (85% of failures of ordinary belts occur in overlapped sections). B. F. Goodrich belts have twin grommets, no fabric or plies in the middle of the belt that stiffen it and generate heat. They have more elasticity, less permanent stretch than any other belt.

Stand shocks better—Actual running tests in field and laboratory show that B. F. Goodrich grommet V belts have a higher safety factor, much greater ability to withstand shock load than do ordinary V belts—actually lasted 20 to 50% longer!

No "lost" cords—In an ordinary V belt much of the cord strength is lost—wasted because all the cords don't pull their share of the load. In a grommet belt all the cords work all the time.

Only BFG has the grommet belt—Twin grommet construction is an exclusive, patented B. F. Goodrich development (U.S. Patent No. 2,233,294). Make sure you get genuine grommet V belts, (for the present made only in the larger—the D and E sizes). Ask your BFG salesman to show you his "X-ray" belt that illustrates grommet construction clearly. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Grommet V Belts BY

B.F.Goodrich

They look the same now

...the difference shows up later!

The top photo shows a group of *Monel** fastenings. The lower, *ordinary* fastenings. Obviously, there's scant difference in appearance. The big difference is in performance!

The Monel fastenings are stronger, tougher, more ductile. They stand heat or sub-zero cold. They're 100% rustless. They resist corrosion by salt water, caustics, most acids. And they keep their good looks.

Try Monel fastenings on your worst problem. Write to Bob Johnson of Inco . . . tell him the type and size you need . . . he'll send you a free sample and a list of distributors.

EMBLEM OF SERVICE INCO TRADE MARK

*Reg. U.S. Pat. Off.

THE INTERNATIONAL NICKEL COMPANY, INC., *67 Wall Street, New York 5, N. Y.*

Specify LARKIN Tubing Heads

for GREATEST ECONOMY, UTILITY, SAFETY

1. Three-Way Service—for flowing, gas-lift and pumping wells.
2. Full Opening for tools or packers.
3. Complete interchangeability of parts assures easy conversion from one type to the other.
4. Forged steel construction, 4500 ≠ test.
5. Larkin stripper serves as blowout preventer, oil saver and positive seal.
6. Low first cost, negligible upkeep.

Specify Larkin " . . . Through Your Supply Store."

LARKIN

. . . Through Your Supply Store

LARKIN PACKER CO., INC.
ST. LOUIS, MO.

Producers
Refiners
Marketers

of petroleum products

Be <u>sure</u> with Pure

THE PURE OIL COMPANY

Marketing Offices in Principal Cities of the Eastern, Central and Southern States

General Offices, Chicago, Illinois

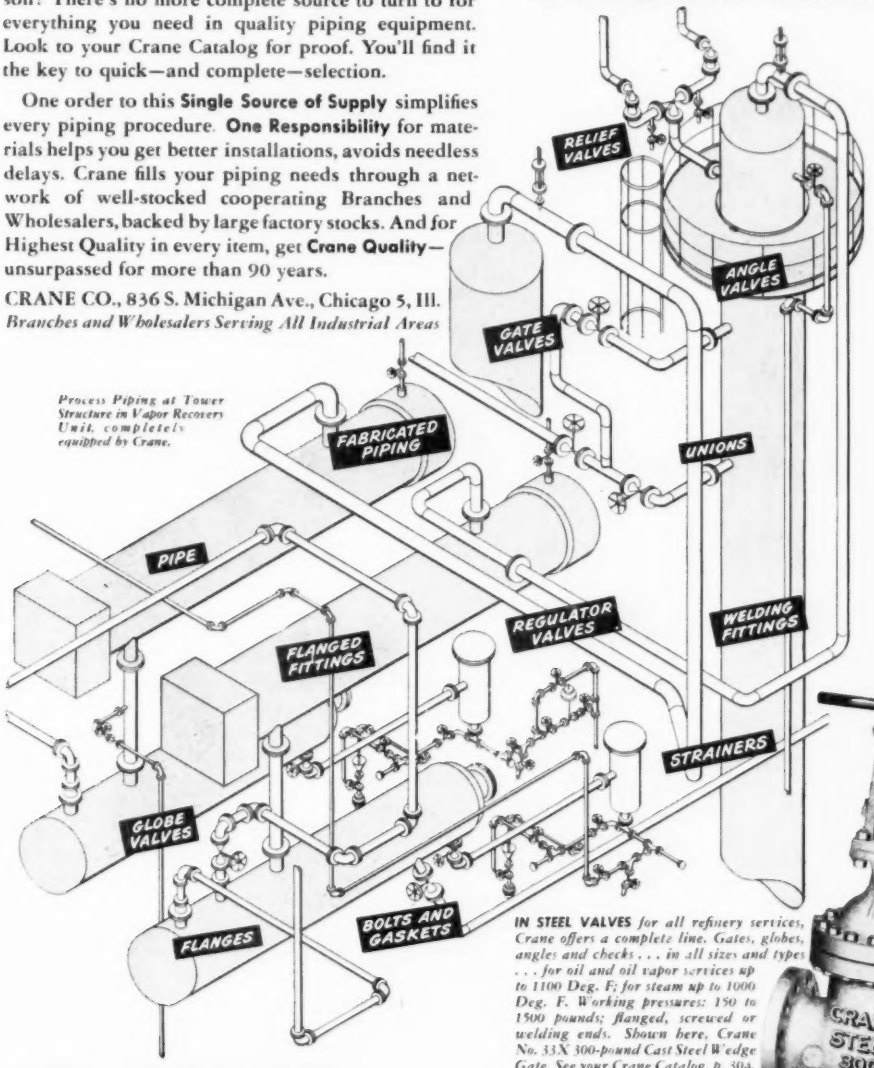
You name it...CRANE supplies it ...Everything in refinery piping

Take This Vapor Recovery Process Piping, for example. Throughout this maze of valves, fittings, pipe and accessories, one name stands out—CRANE. The reason? There's no more complete source to turn to for everything you need in quality piping equipment. Look to your Crane Catalog for proof. You'll find it the key to quick—and complete—selection.

One order to this **Single Source of Supply** simplifies every piping procedure. **One Responsibility** for materials helps you get better installations, avoids needless delays. Crane fills your piping needs through a network of well-stocked cooperating Branches and Wholesalers, backed by large factory stocks. And for Highest Quality in every item, get **Crane Quality**—unsurpassed for more than 90 years.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

ONE SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY



Process Piping at Tower Structure in Vapor Recovery Unit, completely equipped by Crane.

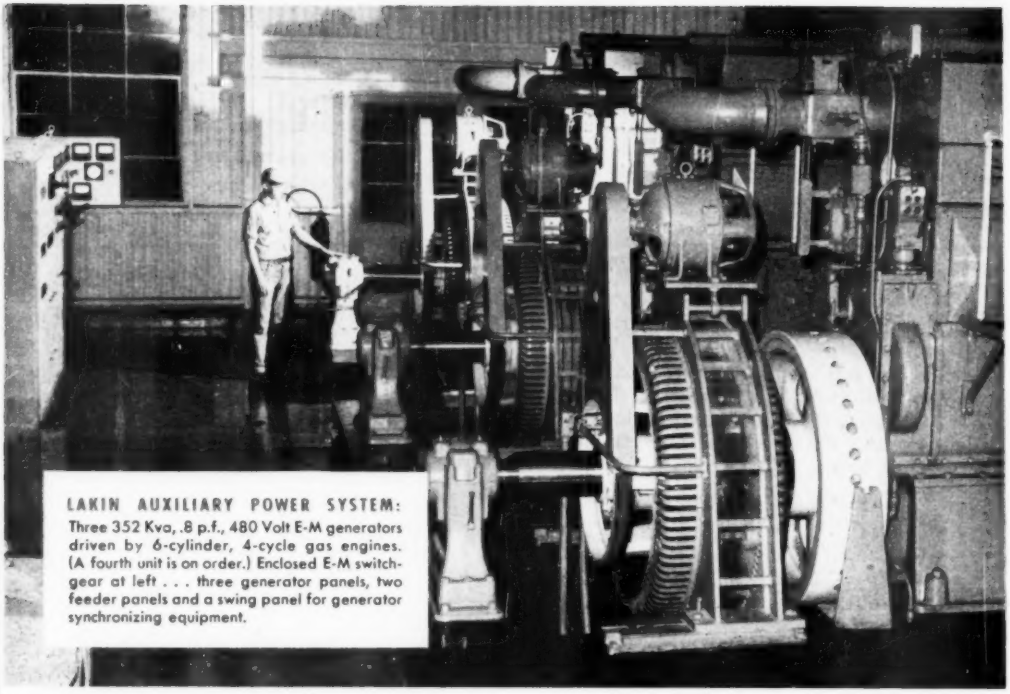
IN STEEL VALVES *for all refinery services, Crane offers a complete line. Gates, globes, angles and checks . . . in all sizes and types . . . for oil and oil vapor services up to 1100 Deg. F; for steam up to 1000 Deg. F. Working pressures: 150 to 1500 pounds; flanged, screwed or welding ends. Shown here, Crane No. 33X 300-pound Cast Steel Wedge Gate. See your Crane Catalog, p. 304.*

EVERYTHING FROM . . .

VALVES · FITTINGS
PIPE · PLUMBING
AND HEATING

CRANE

FOR EVERY PIPING SYSTEM



LAKIN AUXILIARY POWER SYSTEM: Three 352 Kva, .8 p.f., 480 Volt E-M generators driven by 6-cylinder, 4-cycle gas engines. (A fourth unit is on order.) Enclosed E-M switchgear at left . . . three generator panels, two feeder panels and a swing panel for generator synchronizing equipment.

What would happen if the lights went out?

Suppose it happened at 3 A.M. In the sudden, engulfing blackout, the capacity of your pipeline system would be seriously curtailed. Silence at the cooling tower pumps. Air compressors dead. Dangerous heat beginning to mount . . . and the indicating instruments hidden in the dark. However . . . it can't happen here!

The men who designed and built this ultra-modern compressor station at Lakin, Kansas for Colorado Interstate Gas Company were more than usually aware of such hazards—for this is a large, costly and vitally important installation. So they made doubly sure of safety. First, by devising excellent emergency shutdown systems. Second, by specifying E-M generators and switchgear for the auxiliary power system.

Everywhere in the oil and gas industries, engineers know the need for *dependability* in motors, generators and switchgear. There is great significance, therefore, in the fact that many hundreds of E-M installations are now in use at every stage of drilling, pumping, refining and transporting petroleum products.

E-M offers specialized units, backed by the services of specialist field men. Gas-driven generator sets, for example, provide an ideal source of power beyond the power lines. These can be used to start large motors; they have good paralleling ability, and minimum telephone interference. For further information on these and other units, call your nearest E-M office or write to the address below, and ask for publications 1079 and 194.

ELECTRIC MACHINERY MFG. COMPANY
MINNEAPOLIS 13, MINNESOTA

2200-TPA-2086

SPECIALISTS IN GENERATOR AND SWITCHGEAR ENGINEERING

TAKE IT UP...

This 47' diameter 100 ton regenerator cone of a large fluid catalytic cracking unit (designed and now under construction by Foster Wheeler at Abadan, Iran) was lifted 160 feet into place—as planned.

It's all in the day's work —if you know how. Foster Wheeler's "know how" is the product of 30 years' experience in the design, engineering, fabrication and construction of over 500 petroleum processing units.

FOSTER WHEELER CORPORATION

165 BROADWAY, NEW YORK 6, NEW YORK

fabrication

Welding the lower head of one of the larger aluminum towers at the Carthage-Hydrocarbon Oxygen plant at the Carteret, N. J. shop.

Fabrication—in its own shops—of petroleum refining and chemical plant process equipment is one of the most important factors comprising the complete engineering and construction service that is Foster Wheeler.

FOSTER WHEELER CORPORATION

165 BROADWAY, NEW YORK 6, NEW YORK

Complete fabrication facilities are available at four plants: Carteret, N. J., Dansville, N. Y., St. Catherines, Ont. and Egham, Surrey, England.

OTIS "STORM CHOKES"

automatic protection against flow loss from damaged surface connections

Hurricanes and high water versus well connections. Falling barometers mean failing wells if a storm damages or breaks surface connections . . . if wild, uncontrolled flow wastes hundreds of barrels before repairs can be made. Protect your production by installing Otis Removable Tubing Safety Valves in the tubing string – *before* the storm season. Then you'll have an automatic, dependable *sub-surface* tubing flow shut-off if a break or leak occurs at the surface.

Otis Storm Chokes are pressure-differentially-operated type valves, pre-set to allow the flow to follow a single, straight course under normal production pressures. The instant any mal-function of surface connections occurs to the extent that the upward thrust of the pressure differential across the flow bean exceeds the valve spring compression, the tool automatically snaps to a positive shut-off. After surface connections have been repaired, the valve can be re-opened by equalizing pressures across it.

If your wells are in a storm area, or if they are producing near vital installations such as compressor stations, schools, highways, or other public property, you need the positive protection of Otis Safety Valves.

For literature on Otis Removable Tubing Safety Valves and other standard Otis tools and services, write Otis Pressure Control, Inc., Box 7206, Dallas, Texas, or contact the Otis field office nearest you.

The Type F Otis Removable Tubing Safety Valve Cage Assembly (shown in red) is available with three different lock-and-pack-off units for use according to specific well conditions: The Type J Removable Mandrel Assembly which seats and locks in a Type J Otis Landing Nipple and Flow Coupling; the new Type S Otis Removable Mandrel Assembly which allows the tool to be set at any one of several positions in the tubing string and allows the simultaneous use of Otis Removable Bottom Hole Regulators or Chokes in the same installation; and the Type B Removable Mandrel Assembly for wells in which the Types J and S Landing Nipples have not been installed. Each valve assembly can be made up with or without the Otis Equalizing Sub (Type B), and installed and removed under pressure on a steel measuring line with standard Otis running and pulling equipment.

OTIS PRESSURE CONTROL – SERVICE – EQUIPMENT

OTIS PRESSURE CONTROL, INC.

TUBING SAFETY VALVE

(T-31)

DISTRIBUTORS: OTIS PRESSURE CONTROL, INC., DALLAS, TEX.; OTIS EASTERN SERVICE, INC., BOLIVAR, N.Y.; WESTERN PRESSURE CONTROL, LOS ANGELES, CALIF. FIELD OFFICES: TEXAS: HOUSTON, CORPUS CHRISTI, FALFURRIAS, VICTORIA, ODESSA, and LONGVIEW. OKLA.: OKLAHOMA CITY. LA.: NEW IBERIA and HOUMA. MISS.: BROOKHAVEN. EXPORT SALES AND SERVICES: OTIS PRESSURE CONTROL EXPORT, INC., POST OFFICE BOX 7206, DALLAS, TEXAS, U. S. A., CARACAS, SOUTH AMERICA. MANUFACTURE AND DEVELOPMENT: OTIS ENGINEERING CORPORATION, POST OFFICE BOX 7206, DALLAS, TEXAS, U. S. A.

WHEN YOU NEED *Top Speed*—
RUN REPUBLIC ELECTRIC WELD CASING

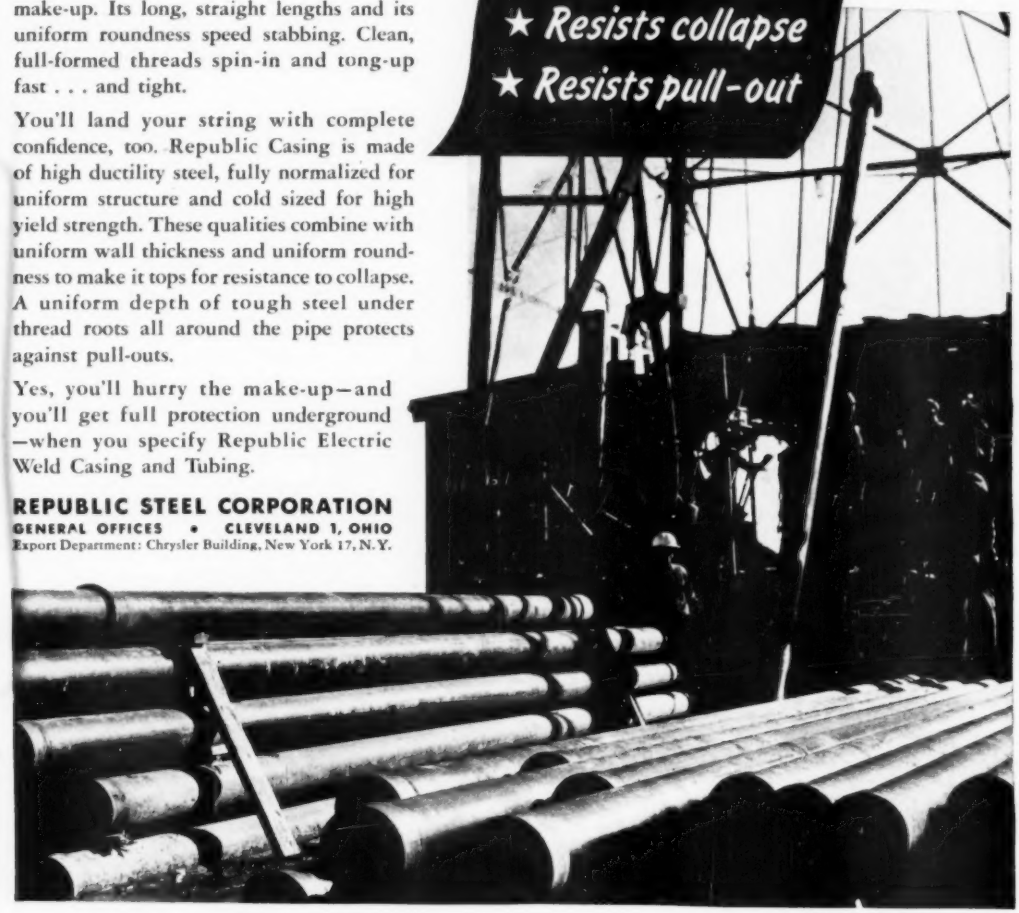
● You're set for speed when Republic Electric Weld Casing is stacked at your rig. This *modern* casing really helps hurry the make-up. Its long, straight lengths and its uniform roundness speed stabbing. Clean, full-formed threads spin-in and tong-up fast . . . and tight.

You'll land your string with complete confidence, too. Republic Casing is made of high ductility steel, fully normalized for uniform structure and cold sized for high yield strength. These qualities combine with uniform wall thickness and uniform roundness to make it tops for resistance to collapse. A uniform depth of tough steel under thread roots all around the pipe protects against pull-outs.

Yes, you'll hurry the make-up—and you'll get full protection underground—when you specify Republic Electric Weld Casing and Tubing.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

★ *Makes up fast*
★ *Resists collapse*
★ *Resists pull-out*



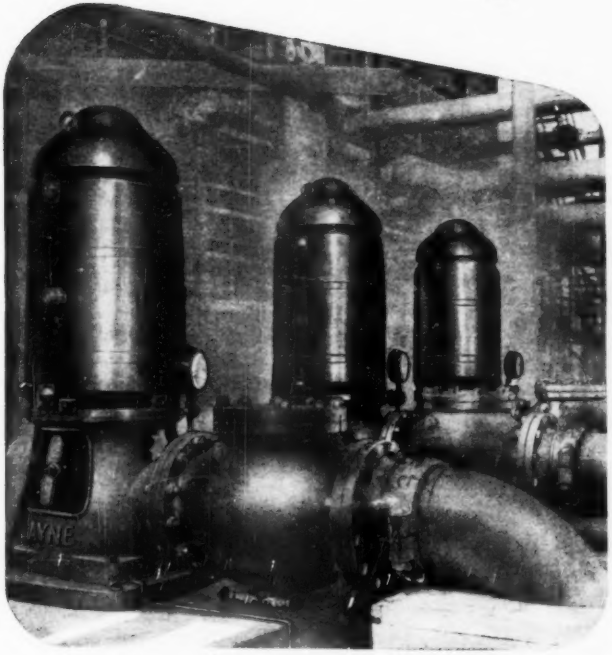
Republic Electric Weld Casing and Tubing are made from flat-rolled steel, both sides of which are inspected. Thus, the surface which becomes the inside wall is free from hidden defects.

REPUBLIC *Electric Weld*
NORMALIZED CASING AND TUBING

REPUBLIC STEEL

Other Republic Products include Line Pipe—Carbon, Alloy and Stainless Steels—Upson Studs, Bolts and Nuts—Electrunite Heat Exchanger Tubes

What About Checking On Operation Cost



High Efficiency Brings Big Saving

In selecting a well water system, the matter of operation cost is of prime importance.

For nearly seventy years Layne has been steadily building more and more efficiency into their well water systems. Today they are accepted the world over as being the most economical of all to operate.

And supporting efficiency, there is an extra ruggedness of construction that insures the maximum in long life. Each unit is precision built of finest materials, resulting in a highly perfected and smooth operating system.

It is an acknowledged fact that Layne has built more fine well water systems than any other firm in the entire world. Furthermore, the Layne method of well construction and pump installation is recognized as being far superior to the usual procedure. And once installed, the Layne organization is always available to supply service and parts, when —and if needed.

For helpful well water system information, catalogs, bulletins etc.

Address
LAYNE & BOWLER, INC.
General Office
MEMPHIS 8, TENN.

Noted For Durability

Layne Well Water Systems are constructed in a manner—and from the kind of materials that give years and years of durability. Layne has never lowered their standards of quality or fine workmanship in order to gain a better profit or to meet a competitive situation. Such a policy has remained constant for nearly seventy years.

LAYNE

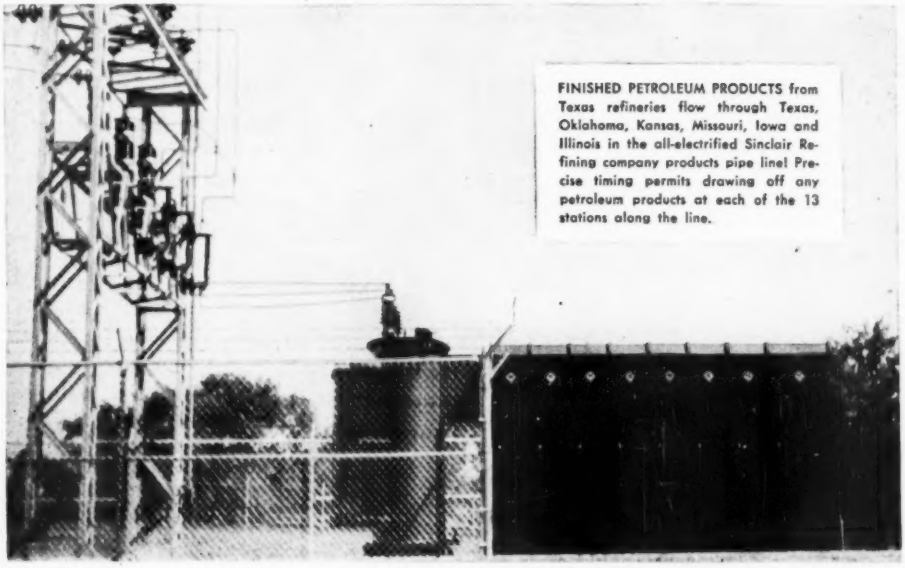
WELL WATER SYSTEMS

Vertical Turbine Pumps

Layne Vertical Turbine Pumps in sizes from 40 to 16,000 gallons per minute may be bought for installation in old wells, or for producing water from lakes, rivers or canals. Write for pump catalog.

AFFILIATED COMPANIES—Layne-Arkansas Co., Stuttgart, Ark. ★ Layne-Atlantic Co., Norfolk, Va. ★ Layne-Central Co., Memphis, Tenn. ★ Layne-Northern Co., Mishawaka Ind. ★ Layne-Louisiana Co., Lake Charles, La. ★ Louisiana Well Co., Monroe, La. ★ Layne-New York Co., New York City ★ Layne-Northwest Co., Milwaukee, Wis. ★ Layne-Ohio Co., Columbus, Ohio ★ Layne-Pacific, Inc., Seattle, Wash. ★ Layne-Texas Co., Houston, Tex. ★ Layne-Western Co., Kansas City, Mo. ★ Layne Minnesota Co., Minneapolis, Minn. ★ International Water Corp., Pittsburgh, Pa. ★ International Water Supply, Ltd., London, Ont. ★ Layne-Hispano Americana, S.A., Mexico, D.F. General Filter Company, Ames, Iowa

Switchgear Units Protect 1500 Mile Sinclair Pipe Line!



FINISHED PETROLEUM PRODUCTS from Texas refineries flow through Texas, Oklahoma, Kansas, Missouri, Iowa and Illinois in the all-electrified Sinclair Refining company products pipe line! Precise timing permits drawing off any petroleum products at each of the 13 stations along the line.

45 Allis-Chalmers outdoor, high-voltage switchgear units and 28 Type "H" auxiliary units protect vital power supply!

THESE ALLIS-CHALMERS SWITCHGEAR UNITS are equipped with 50 mva interrupting capacity, air magnetic breakers, thermal overload and undervoltage relays. These switchgear units combined with Allis-Chalmers OISC transformers form *unit substations* that provide remote starting and stopping of station equipment.

NOTE THESE SWITCHGEAR FEATURES!

- Steel-enclosed cubicles are completely weather-proof.
- Each unit is operationally safe; complete with interlocks and grounded, all-steel compartments.
- Standard design of the pre-fabricated units provides uniform maintenance in all similar installations.

In addition, pump drives for these Sinclair stations are new Allis-Chalmers tube-type, explosion-proof 400 hp motors!

For complete information on the job Allis-Chalmers switchgear can do for you, call your nearby A-C Sales Office or write direct. A-2795

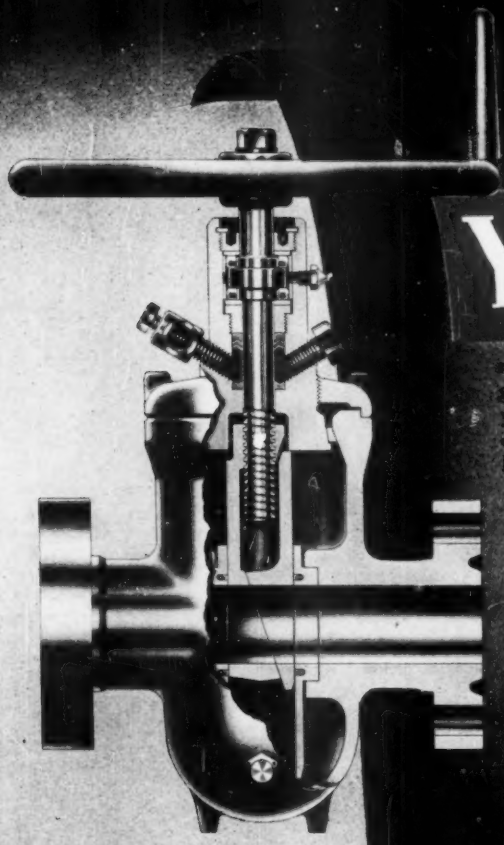
ALLIS-CHALMERS, 1059A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS

Texrope is an Allis-Chalmers trademark.

Power, Electrical, Processing Equipment for Petroleum Industry

You Made W-K-M Valves Best in the Industry . . .



YOU, the user, dictated the design of W.K.M. Valves to meet your specific needs. You suggested design refinements from your extensive operating experience. Since the beginning you have been the key man in the development of these superior valves. These are the reasons why the quality and performance of W.K.M. Valves fit so perfectly every requirement of the oil industry, and why they are recognized as the leading valves in their field. It makes good business sense to specify W.K.M. for every application.

W-K-M Company, Inc.

OIL FIELD, PIPE LINE & INDUSTRIAL EQUIPMENT

HOUSTON, TEXAS, U. S. A.
LOS ANGELES

Cable Address: "WILKOMAC"
Export Office: 30 Rockefeller Plaza, New York, N. Y.

Here's one place to

reduce downtime

● You can eliminate many costly rig tie-ups by making certain that your wire line is always in first-class condition . . . ready for service every minute of every shift.

First, make sure that you get highest quality and finest workmanship in wire lines by specifying American Tiger Brand. Our catalog will help you select the correct size, construction and the most suitable grade of steel.

Second, give your wire lines the kind of care that adds thousands of ton-miles of service to every reel. For example, keep an accurate check on line wear so that you can shift the line at the proper time and thus distribute wear. Our booklet, "Valuable Facts about the Care and Use of Wire Rope," contains many other suggestions that will add appreciably to line life.

American Tiger Brand Wire Lines, given proper care, will help you get rid of many downtime headaches. Mail the coupon today.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

SEND FOR THIS LITERATURE

American Steel & Wire Company
Rockefeller Building, Dept. 9-J
Cleveland 13, Ohio

Please send me:
☐ "American Tiger Brand Lines for the Oil Industry"
☐ "Valuable Facts about the Use and Care of Wire Rope"

Name .....
Company .....
Address .....
Position .....

AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL

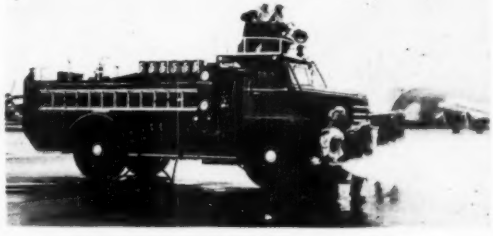
NEW! Fast, powerful, high-capacity WALTER FIRE FIGHTING UNIT

Combines many unusual features for more effective control of oil and gasoline fires.

WHEN A FIRE STRIKES, every second counts... in getting to the scene, in getting the fire under control. On both essentials, Walter Fire Fighting Units are a great advance over existing equipment. No matter when or where the fire occurs, this Walter unit gets there fast and unfailingly, despite mud, sand, snow, slippery surfaces or grades . . . bringing tremendous fire-snuffing power with it.

This giant 240 hp. Walter Tractor Truck, is equipped with 1,000 gals. of water, 90 gals. of foam liquid for mixing, 800 lbs. of carbon dioxide, together with auxiliary pumps, metal ladders, cutting equipment and hand fire extinguishers. It has three ground-sweeping nozzles, two turret nozzles and three handline nozzles, which can discharge a total of 4,800 gallons of fog-foam mixture per minute, at 300 lbs. per square inch pressure.

Featuring the famous Walter Four-Point Positive Drive, this unit provides 100% traction in all four driving wheels. This fact, plus the extra large rolling diameter of huge, low-pressure tires, assures all-surface, all-season transportation. The unit accelerates to 45 mph. in one minute.



Recently designed and adopted for airport rescue and fire control work, this Walter unit incorporates the latest, approved aeronautical emergency fire-fighting techniques. WRITE TODAY for literature giving complete details and specifications.

WALTER MOTOR TRUCK CO.
1001-19 Irving Ave.
Ridgewood 27,
Queens, L. I., N. Y.

WALTER
4-POINT POSITIVE DRIVE
TRACTOR TRUCKS

INSURE MAXIMUM REFINERY PERFORMANCE

longer continuous runs
decreased coking troubles
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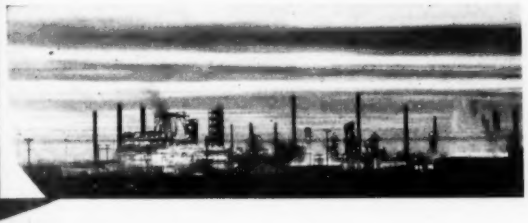

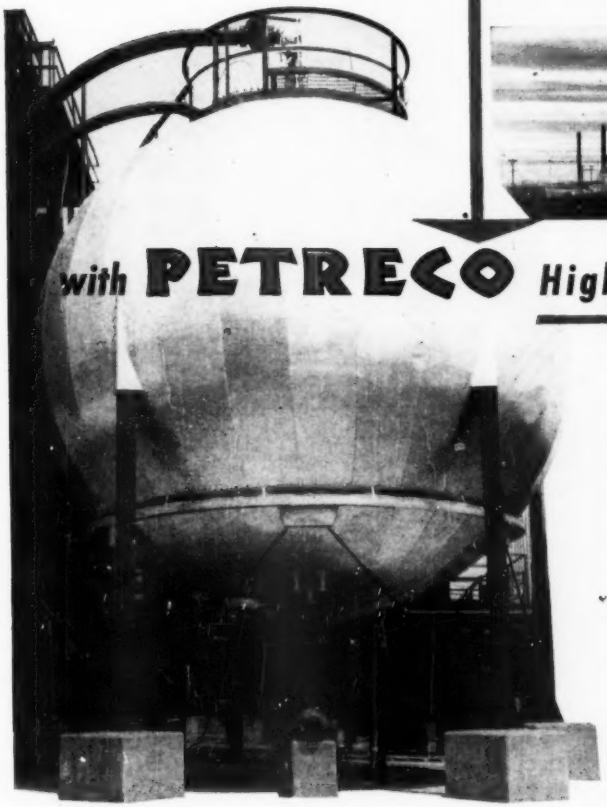

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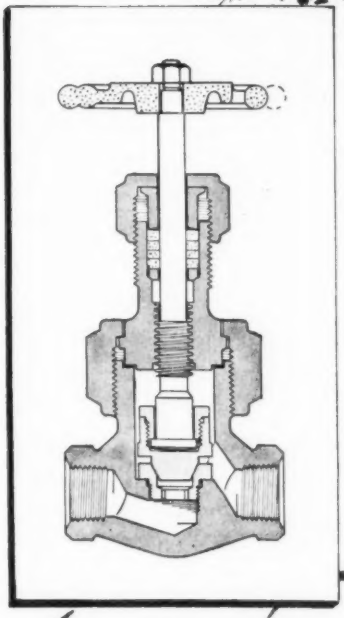

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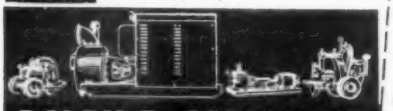

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They Say—

More Winter Demand

"All evidence points to the fact that winter peak loads will become more pronounced in the future. Furthermore, the future potential increase in heating-oil demand is considerably greater than the potential increase in gasoline demand. Some authorities predict that within a comparatively short time, the gasoline demand of the country will level off, even though the number of automobiles in use may continue to increase somewhat each year. If the plans and hopes of the automotive engineers materialize, the automobile of the future will deliver a considerably increased mileage per gallon, thus to a considerable extent balancing the increased demand from the additional cars that may be put in service." *K. E. DeRosay, manager of fuel-oil sales of Sun Oil Co., addressing New York State Retail Solid Fuel Merchants Association.*

Higher Octane Rating

"It is now apparent that the long-promised new era of higher-compression engines in automobiles is definitely under way. The popular reception being accorded the flashing performance of the new engines in the 1949 Cadillac and Oldsmobile Rocket means that other makes will be coming out with higher-compression power plants in the not-too-distant future. The evolution of this new type of engine was made possible by the pioneering work of oil companies in developing gasolines of higher octane rating and greater qualtiy." *The Sohioan, Standard Oil Co. of Ohio.*

The Why of Dividends

To Stockholders:

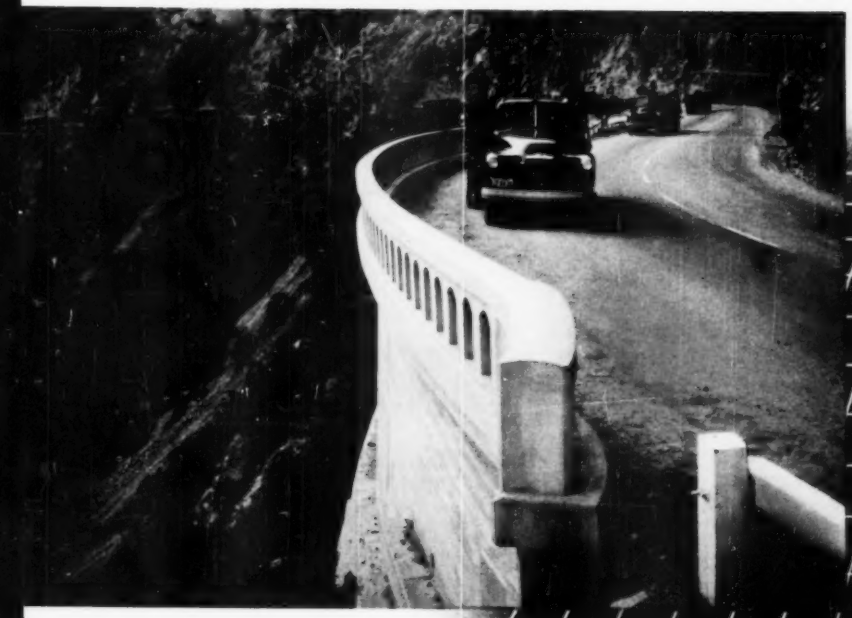
"Enclosed herewith you will find check in amount equivalent to 75 cents per share on stock of the corporation. . . . This 4th quarterly dividend was made payable September 10 rather than October 1 with the idea that it may be of assistance in meeting September 15 income tax payments." *H. R. Morehead, Jr., Treasurer, Gulf Oil Corp.*

Good Charts

Sir:

"The article Compressibility Factors of Natural Gases in the September 8th issue of The Oil and Gas Journal

DUPONT TETRAETHYL LEAD COMPOUNDS



Test courses for the West Coast truck fleet cover all types of terrain.

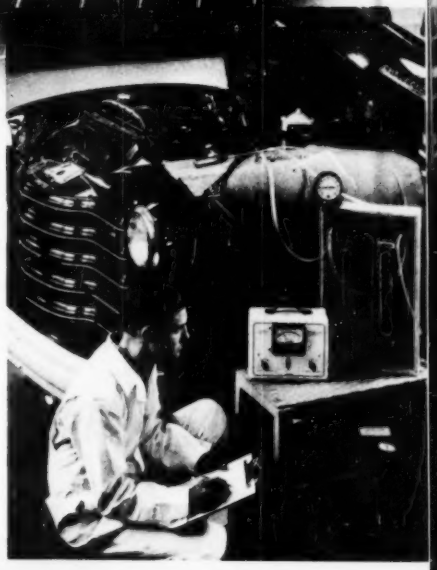
Du Pont Research

at Work on Fuel Variables Affecting Engine Performance

It is well recognized there are a large number of fuel variables that affect engine performance. While much can be learned about these through laboratory research . . . it is necessary to supplement this information through carefully controlled research on the road.

As a part of its Petroleum Chemicals research program, Du Pont is conducting an intensive investigation of the effects of tetraethyl lead compounds and other fuel additives under all types of service conditions. Fleets of passenger cars, running under medium duty conditions, operate out of the East Coast Road Testing Laboratory at Deepwater, New Jersey, while heavy duty truck tests are conducted from the El Monte, California, Laboratory.

The test results, being obtained in these cars and trucks, are used as a guide in research on fuels and additives to assist the petroleum industry in the production of improved fuels which in turn benefit the motorist.



Engine adjustments are carefully made to insure uniformity of performance.

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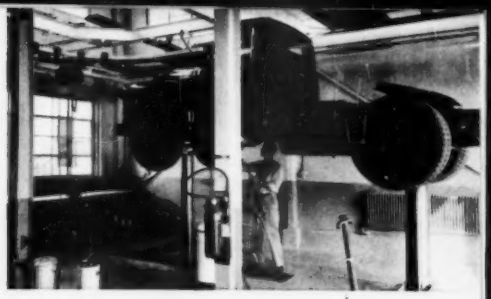
BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Test trucks are operated in groups to provide comparative results.



Tractor units are carefully serviced to maintain peak operating efficiency.

When a test is completed, each engine part is carefully examined to determine the effect, good or bad, of additives under investigation.

West Coast Provides Heavy Duty Truck Tests

The Du Pont West Coast Road Testing Laboratory is the "heavy duty" test center. Here, tests simulating heavy duty truck service are conducted over terrain ranging from flat desert country to steep mountain grades making it possible to duplicate the wide variations in operating conditions encountered in service.

Equipment and courses are standardized; in addition, all of the trucks are operated simultaneously as a group to eliminate the variables of terrain, weather, traffic, etc. In this way tests are under rigid control and comparative and reproducible results are obtained.

Day and night this test fleet is piling up mileage investigating fuels and additives and the other variables affecting fuel performance. These heavy duty tests represent one extreme of operating conditions and are part of a long-range program investigating additive requirements for today and for the future.

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is very interesting. We have been using the George Granger Brown factors in connection with gas well testing and reserve calculations. I believe that we would find it more convenient to use the charts presented in your article, in place of the George Granger Brown chart, if they are available in sets, on a larger scale and in greater detail.

"It will be appreciated if you will please advise me whether or not such sets are available and their cost."

Clifford R. Horn,
Production engineer,
Production and Gathering Dept.
Panhandle Eastern Pipe Line Co.
Liberal, Kans.

Editor's note: The Journal's larger-sized original tracings can be used for making direct prints and sets are available at actual reproduction cost.

Progress

"In 1896 there were only four gasoline motor cars in this country—one built by Haynes, one by Henry Ford, one by Duryea, and one by Benz of Germany. Today we travel anywhere and everywhere in approximately 40,600,000 automobiles, trucks, and buses, and in 90,000 commercial and private airplanes. Gasoline has converted a continent into a neighborhood.

"Yet, the automobile is but one of the benefits that oil has brought us in a brief span of 90 years. . . .

"Look about us at all of the objects made or fashioned by man. It is difficult to find a single item that does not owe at least its production, manufacture, and transportation in part to the aid of oil." *On Tour, Union Oil Co. of California.*

Profit and Loss

"It is a socialist idea that making profits is a vice. I consider the real vice is making losses." *Winston Churchill.*

The Issues:

CAPITALISM—If you have two cows, you sell one and buy a bull. Produce more cows—more milk—more beef—make supply plentiful.

SOCIALISM—If you have two cows, you give one to your neighbor.

COMMUNISM—If you have two cows, you give them to the government and the government gives you some milk.

FASCISM—If you have two cows, you keep them and give the milk to the government and the government sells you some skim milk.

NEW DEALISM—If you have two cows, you shoot one and milk the other and pour the milk down the drain. *Bulletin, Kansas Oil Men's Association.*

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JOURNALLY Speaking

Getting Up Steam

SECRETARY KRUG and the other bureaucrats who lie awake nights worrying over how the Government can save the people from running out of oil ought to read the piece on page 191 in last week's issue about drilling for heat in Iceland.

There's a country which doesn't ask any ERP loans to build up an oil industry but gets along without fuel by using heat from the earth.

Now there's an idea the Government ought to rate ahead of synthetic fuels and alky-gas as a substitute for quote our fast-diminishing petroleum reserves unquote.

There are lots of hot springs in this country, and who knows what lies beneath them? Little oil seeps led to the discovery of big oil fields, and if "Cap" Krug would assign the Bureau of Mines or somebody to drill near hot springs the way Colonel Drake drilled near some oil springs they might find a buried volcano or steam field.

The more we think about this, the stronger it is that the idea hasn't been grabbed off before. It looks like a natural for politicians. Just picture a bureaucrat asking Congress for a modest appropriation to begin a census of hot springs and their temperature readings. Another bureau would be assigned the task of building experimental pilot plants on a semicommercial scale to be ready in case the scheme proved feasible. Still other bureaus would be brought in to plan such details as building access roads, disposal of the used water, and fair allocation of the heat and power to be produced.

That's just the beginning. The Supreme Court would be asked to rule that the earth's heat belongs to the federal Government because the states failed to reserve it specifically when they joined the Union. National Defense Thermal Reserves would be set aside to be sure of enough steam for the next war. Politicians could make wonderful speeches about preserving this natural resource for the benefit of the people and using it to combat the oil monopoly.

On second thought, however, we see that the idea is impractical. Most of the hot springs are in the national parks, and commercial activity there would disturb the wildlife. Since the Interior Department won't permit oil drilling in the Everglades for this reason it certainly wouldn't let noisy drillers poke around any of the hot springs in its custody.

Getting Clubby

A RASH of sociability seems to have broken out in the oil industry. Los Angeles has just formed a Petroleum Club, following closely in the wake of Casper, Billings, and Wichita. New Orleans and Dallas have had thriving Petroleum Clubs for years, Denver's has been going strong for more than a year. Shreveport and Jackson have them also. Houston's club is looking for quarters, and Oklahoma City and Wichita Falls are talking about forming clubs. Perhaps there are still others we haven't heard about.

If this club movement keeps growing, Tulsa may soon be the only oil town without a place where the clan can gather for lunch and fellowship.

Spuds and Oil

OFFICIALS of the Bureau of Mines have outlined a big program of possible technical research on problems of oil production and secondary recovery, but complained to oil men that their appropriations are too meager to permit more than a fraction of the work, much less, in fact, than the Government pays same individual potato growers for not selling their spuds.

The oil men gave them a towel to cry into but not much sympathy, the general feeling being that it is better for the industry to do its own research, or do without, than to get mixed up in the kind of politics that has embroiled the potato growers. Some day, maybe, the political gravy is going to be scraped off and the potato program will be skinned, mashed, and hash-browned.

—Henry D. Ralph

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Baker Triplex Cement Baffle Collar (Product No. 137) is used when a stop for the cementing plug is desired, to retain cement tailings inside the casing.

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THE OIL AND GAS JOURNAL

Three-Quarter Mark

THE oil business is accustomed to evaluate its activities on a quarterly basis—financially and otherwise. On Friday the books will be closed and the industry can look back over the first three-quarters of 1949—a retrospect of significance as a guide to the remainder of the year and later.

Before the final quarter of 1948 was over it was apparent that the oil industry everywhere was faced with its recurrent problem of excessive supplies, which if continued would result in waste and become dominant in markets. The new year started at that point.

The entire 9 months has been devoted to corrective operations, with the drop in crude-oil production from late December to mid-July totaling nearly 1 million barrels daily. An average decrease of about 5½ per cent in total domestic supplies was partially offset by an increase of 110,000 bbl. daily or 22 per cent in imports to August 1, according to the latest report of the Bureau of Mines. In further reflection of the strong foreign supply situation, exports have decreased 8 per cent.

But the primary objective of ending the steady accumulation of crude-oil stocks which started a year ago, was ended in June and since that time inventories have been reduced approximately 15 million barrels. Furthermore, it has been possible to expand domestic output in recent weeks.

The refinery situation is not so clearly defined. The manufacturing end of the oil business, after 3 postwar years, has ceased to be controlled by the demand for products consumed as fuel and burning oils. Supplies of these products caught up with demands at that time. Later a disappointing winter consumption added to the storage of all residual and intermediate products.

Marked changes have been necessary in refinery processing. Yields of gasoline, the demands for which have been about in line with projections, have returned to prewar levels. These shifts in yields, plus a reduction in total runs to stills, have enabled operators to change some of the unwanted conditions in products.

The improvement in heavy fuels east of California in recent weeks has been particularly noteworthy, a change for the better which unfortunately does not include West Coast operations. The distillate and kerosine production and stock situation in relation to expected demands over the next 6 months is stronger than it was a year ago, but that situation does not apply to gasoline. It is agreed that continued improvement in refinery markets is dependent on operators' willingness to make seasonal adjustments in yields so that the expected demands for distillate and burning oils will be supplied without accumulating burdensome gasoline stocks.

In summary, operators, aided by state conservation bodies, in 9 months have made effective corrective measures in a manner not duplicated as to time and extent during any previous period in oil history. There is more to be done but the base has been established, the "know how" shown.

Ultimate Effect of Devaluation On Oil Industry Still Not Known

by Dahl M. Duff

NEW YORK.—United States oil companies still were uncertain this week to what extent the devaluation of the British pound and other currencies affect the American oil industry.

The No. 1 question continued to be whether British companies will raise their sterling oil prices and by how much. Early this week these companies—or more properly the British Government—had not made known their intentions.

A hint to the answer might be found in Canada, which devalued its dollar 10 per cent following the British pound action. In Alberta crude-oil prices in three fields were increased 25 cents by Imperial Oil, Ltd.

The company said the action was taken to permit Alberta oil prices to come back into balance with world prices.

The 25-cent increase brought Leduc and Woodbend crude to $3.20 and Golden Spike to $3.18 per barrel. Turner Valley crude was raised 20 cents to $3.44 per barrel for 33°-gravity crude, with a 2-cent differential to $4.06 for 64°-gravity oil. *(Prices are in Canadian dollars. On September 26 the Canadian dollar was quoted at 89½ cents by United States banks.)*

Increase Probable

In the complicated devaluation question, a number of reasons were advanced as to why the British should or should not advance their prices. The greater weight of opinion seemed to favor some upward adjustment on the part of the British companies.

The English companies sell oil for both sterling and dollars. The devaluation naturally does not affect their dollar sales, but an unchanged sterling price would be some 30 per cent lower in terms of dollars.

It was pointed out last week that the United Kingdom as well as the rest of Europe buys important quantities of products in the Caribbean area, paying dollars in a dollar market. If the sterling oil price were not changed to compensate for the devaluation, there would, without government subsidies, be a dual price structure for products, one based on sterling oil and the other on dollar oil. There is no chance that devaluation would force a 30 per cent cut in dollar oil which is priced on a U. S. Gulf Coast basis.

One clue as to the possible action of the British Government was a report from London that the government there had indicated the British public will probably pay about 3 pence additional for its motor fuel. This would approximately equal a 30 per cent increase in the refinery price, disregarding taxes.

An increased products price in the United Kingdom is inflationary and contrary to the announced aims of the Labor Government in making the devaluation. Other countries which also have devalued similarly to the British will pay no more for sterling oil, but their necessary purchases of dollar oil will cost more. In view of these considerations, there was some feeling that though the British may raise their sterling oil prices, it may not be by the full amount of the devaluation and thus represent something of a compromise.

ECA View Not Clear

Some doubt has been placed on the over-all ability of the British companies to increase their production by a large amount to supply larger markets. Transportation and refining facilities are limited. These facts apparently are not thoroughly recognized by some officials of the Labor Government, who are said to feel that the large underground reserves held by British companies in Iran and elsewhere represent a solution to their dollar-shortage difficulties.

The position which the Economic Cooperation Administration will take in the matter of sterling versus dollar oil is not clear. This agency finances large purchases of dollar oil from both the Persian Gulf and the Caribbean area. It provides dollars only for transactions made at competitively low prices.

Regardless of the decision of the British on a new price level for their sterling oil, American oil officials generally believe devaluation will make their competitive position more difficult in foreign markets. Though the American oil companies faced difficult currency problems long before the war, the postwar difficulties of England and the nonconvertibility of currency has made the situation much more acute in the last 2 years.

In Washington secret discussions continued between American, British, and Canadian delegations as representatives of the three countries continued attempts to bring about some understanding as to British oil expansion and its effects on American companies operating in foreign markets.

Power to Fix Price of Gas in Kansas Upheld

THE power of the Kansas Corporation Commission to fix a minimum price for the sale of natural gas has been upheld by the state's lower courts.

The decision was announced by District Judge Ray H. Calihan sitting at Garden City September 26, but the written opinion has not yet been filed.

Acting under a Kansas conservation statute of 1945, the Corporation Commission issued an order, effective March 1, 1949, fixing a minimum price of 8 cents per thousand cubic feet for the sale of natural gas in Hugoton field. Prior to the order the weighted average price of gas sold from the Kansas portion of Hugoton field was about 5½ cents.

The order was challenged in the courts by Panhandle Eastern Pipe Line Co., Northern Natural Gas Co., and Kansas-Nebraska Natural Gas Co., all purchasers of large quantities of Hugoton gas for transportation to eastern Kansas and other states. They argued that the order exceeded the conservation powers of the commission, upset their gas-purchase contracts, and violated their constitutional rights.

Purpose: Conservation

Attorneys for the Corporation Commission argued that the minimum-price order was solely for purposes of conservation and not an attempt to fix prices as such. The Kansas conservation law defines economic waste as sale below cost of production, and the commission had determined that any sale of Hugoton gas below 8 cents per thousand constituted economic waste.

No waste of gas in the field or in transmission was charged, and the argument was based on waste in consumption in that natural gas is being sold below the cost of competitive fuels. Commission attorneys argued that the placing of a minimum value at the wellhead is simply a tool of conservation, and that if gas is sold below the cost of production and below the cost of other fuels Kansas' gas will be depleted rapidly and at an economic loss.

The case undoubtedly will be appealed to the Supreme Court of Kansas, and probably to the Supreme Court of the United States.

This is the first time that any state order fixing minimum field prices for gas has been upheld in a court. Oklahoma has a somewhat similar law and its Corporation Commission fixed a minimum price of 7 cents per thousand cubic feet in the Oklahoma portion of Hugoton field, but this case has been pending before the Oklahoma Supreme Court for about 2 years without a decision.

Boyd, President of A.P.I. Since 1941, to Retire in November

by Dahl M. Duff

NEW YORK.—William R. Boyd, Jr., president of the American Petroleum Institute and a leading figure in the oil business for the last 29 years, will retire following the Institute's annual meeting in Chicago, November 7-10.

Boyd's intention to relinquish the A.P.I.'s top executive post was made known to the directors earlier this year, but there were indications he would continue to serve through the 1950 term.

In an interview, the A.P.I. president said he has since decided definitely to step down this November and not stand for reelection for another year. While there has been no general announcement, Boyd said he had made his decision known to anybody interested.

Successor "Wide Open"

It is said that the matter of a successor to Boyd is "wide open" with the selection in part to depend on the plans agreed as to the future policies which will guide A.P.I.'s activities. The names of Dr. Joseph E. Pogue, vice president of the Chase National Bank, New York, and Frank M. Porter, president of the Mid-Continent Oil and Gas Association, have been mentioned in this connection.

Pogue is widely known in the petroleum industry for his economic studies and previous to accepting his present bank position was engaged in consulting work in the petroleum industry. Porter is associated with Fain-Porter Drilling Co. of Oklahoma City. As president of the Mid-Continent association he has spent a large part of his time at the Washington offices representing the membership in legislative and other government matters. It is said that Gen. Baird H. Markham, head of the American Petroleum Industries Committee will not be a candidate for the position.

There are four committees now studying the over-all A.P.I. management plan and activities program. The directors several months ago set up a five-man committee headed by Eugene Holman, president of Standard Oil Co. (N. J.) to study the Institute's management and determine the advisability of returning to the previous plan of an honorary president from the industry with active control in a paid executive vice president. The nominating committee under George A. Hill, Jr., president of Houston Oil Co. of Texas, is waiting for Holman's group to complete its work before proceeding with a choice of Boyd's successor.

WILLIAM R. BOYD, JR.

The future direction of the Institute also may be vitally affected by the work of two other association committees. One of these is a board committee headed by A. Jacobsen, president of Amerada Petroleum Co., which is studying A.P.I. functions and projects to determine if some of these should be dropped or possibly others added.

Another committee is a special group reporting to Boyd and headed by L. S. Fish, Standard Oil Co. of California. This committee is an administrative review group studying the A.P.I.'s internal organization. There have been unconfirmed reports this committee has recommended several far-reaching changes, including moving the main office from New York to Washington and transferring the Dallas and Los Angeles staffs to the headquarters. It is also known that some members of the board of directors favor Chicago for general headquarters.

Boyd's Service Outstanding

Boyd, who will be 65 in January, said he felt it is time for younger men to take over the affairs of the Institute. At the same time, he made it plain he is no "sick old man" as some gossip may have suggested.

"These last few years have been particularly strenuous," Boyd said. "The next year or two probably will be the same. I simply want to get out and be in a position where I can feel that my time is my own."

Boyd said he had no particular plans except that he wanted to rest a while and would probably make Texas his "base of operations." He still maintains legal citizenship in his native state and has ranch and farming property near Teague, south of Corsicana.

Previously a country lawyer and banker, Boyd joined the A.P.I. in November 1920 and a few months later was made assistant general secretary and counsel. The A.P.I. had been organized the previous year. In December 1928 he became executive vice president when that position was created. He served in this capacity until his election as president in October 1941.

Under the present A.P.I. setup, the vice presidents are honorary and the staff under Boyd drops to functional officials. Boyd heads the Institute's directors and during his 29 years of service, has missed only two or three meetings of this governing group or the executive committee.

Probably Boyd's outstanding contribution to the oil industry and to the nation came during the war period. He moved his headquarters to Washington as soon as the war clouds gathered and as chairman of the Petroleum Industry War Council directed the oil industry's war activities. For this leadership he was awarded by President Truman the Distinguished Service Medal for Merit, the highest award given a civilian.

NPC Schedules Autumn Meeting October 25

WASHINGTON.—The National Petroleum Council's fall meeting will be held October 25, it was announced last week by Chairman Walter S. Hallanan.

Urging that every member of the council attend if possible, Hallanan said a number of vital problems have been scheduled for consideration, including reports of the committees on petroleum imports, industry manpower and reserve productive capacity.

The council also will take up a request forwarded last week by the Oil and Gas Division for a new study of liquefied petroleum gas. A report on L.P.G. was made by the council in July, 1948, but federal agencies interested in consumer problems and in housing feel that it is incomplete and are desirous of having it brought up to date. While these agencies want to get a complete picture of the supply situation, it is generally believed that a study will reveal that there are no big problems at this time.

Four States Can Supply Liquid Fuels 40 Years, Bureau Says

WASHINGTON. — Sample surveys of just four states have indicated that they alone have coal, shale, and natural-gas sufficient to produce between 9,000,000 and 10,000,000 bbl. a day of synthetic liquid fuels for a period of up to 40 years, it was announced last week by the Bureau of Mines on the basis of reports compiled by the Army Corps of Engineers.

On the basis of these findings, a $1,341,637 contract was entered into with Ford, Bacon & Davis, Inc., of New York for a nation-wide survey to determine the most advantageous areas in which synthetic fuels plants could be located. Of the four state studies, one was made by the Army Engineers and the other three by Ford, Bacon & Davis, the latter under a $114,000 contract.

In the sample surveys, general areas in each of the four states were examined critically with reference to eight major factors—raw materials, water supply, power supply, access transportation, labor and housing, marketing, waste-disposal facilities, and strategic considerations.

The studies were initiated as a preliminary step in the development of a synthetic liquid-fuels industry in the event Congress should enact legislation now pending which would authorize the Reconstruction Finance Corporation to lend funds to private industry for the construction of commercial plants.

Similar legislation was given committee consideration in the Eightieth Congress but no action was taken. Further hearings are expected to be held this winter on the bills now pending, introduced last January by Sen. Pat McCarran of Nevada and Rep. Charles A. Wolverton of New Jersey.

The sample surveys were intended merely to develop methods and techniques for a nation-wide study, which will cover 37 states and Alaska, and were confined to areas known to contain large quantities of raw materials for synthetic fuels. How extensive a part these areas—in Kentucky, Colorado, Texas, and Montana —will play in the synthetic-fuels industry of the future will be capable of determination only after the full study is completed. The four state studies involved no core drilling or sampling, but were based entirely on information available but hitherto unassembled.

Western Kentucky

In western Kentucky, it was found that coal reserves available for synthetic liquid fuels total 16,768,000,000 tons, enough to meet the requirements of either 138 10,000-bbl. daily synthine (modified Fischer-Tropsch) process plants or 164 hydrogenation plants of the same size for 40 years.

Water supplies would be adequate for these plants, and the area is favorably situated with respect to the large oil-consuming centers of the Midwest, which could be served by short pipe lines or by water transportation. Other factors, such as electric power, labor, and housing, would present no insurmountable problems in the development of a synthetic-fuel industry.

Northwestern Colorado

Northwestern Colorado has coal reserves yielding 25 gal. or more per ton which could be reached without deep-shaft mining in sufficient volume to support 105 10,000-bbl. plants for 40 years, together with available coal reserves adequate to supply 279 synthine plants or 336 hydrogenation plants.

Water, however, is a critical resource in this area, and the supply that would be available by 1963 for all new uses would limit the synthetic-fuel capacity to 1,050,000 bbl. per day from shale plus between 510,000 and 840,000 bbl. per day from coal, depending on the process used. Also, it was emphasized, by the end of this century, water available for use in synthetic-fuel plants may approach zero if no priority claims have been established.

Such problems as electric power, labor and housing also are difficult, but are seen capable of solution. The best markets for large production in this area would be the West Coast and North Central states, by pipe-line transportation.

Southeastern Texas

An estimated 9,500,000,000,000 cu. ft. of natural gas that might be converted into synthetic fuels is available in southeastern Texas, sufficient to support 15 10,000-bbl. plants for 20 years, but under normal conditions, the report said, there is a very definite question as to the availability of this gas because of the economic and conservation considerations involved. For one thing, it was pointed out, the gas is now being recycled to maintain the pressure in petroleum reservoirs, and its diversion too soon to another use could result in a considerable loss of natural products. Adequate water supplies are available or could be developed.

Southeastern Montana

The Engineer Corps survey of southeastern Montana showed that mineable coal reserves and water supplies are sufficient to support some 362 synthine plants for a 40-year period, and enough low-cost strip coal is present to operate 15 such plants for 20 years. The North Central states would be the nearest and most logical potential market area for any liquid fuels produced.

Carthage Hydrocol to Increase Investment

WASHINGTON. — The Securities and Exchange Commission has granted an authorization to the United Gas Corp., Shreveport, La., to increase its investment in Carthage Hydrocol, Inc., now constructing a plant near Brownsville, Tex., for production of gasoline from natural gas.

New financing of the Hydrocol venture was necessitated by the changes in plans and increased costs which have upped the estimated aggregate cost of the plant, including necessary working capital, from $14,000,000 to $38,168,000. The Reconstruction Finance Corporation has agreed to lend up to $18,500,000, but not more than one-half the cost of the plant.

United Gas and other selected subscribers first acquired $10,000,000 of notes, due in 1980, and 75,000 shares of common stock at a total consideration of $10,075,000, of which United's share was 10 per cent. In a later subscription, United acquired another 35 units for $352,625. The new financing contemplates the offering of subscriptions to 600 additional units, including 60 units being acquired by United Gas plus 22.725 units by way of oversubscriptions, all for an aggregate cash consideration of $833,-454.38.

Hydrocol may be something of a campaign issue next year by reason of the fact that Guy G. Gabrielson, new chairman of the Republican National Committee, is president and counsel for the corporation.

Gabrielson is an arch foe of "statism," which will be the keystone of the Republicans' congressional campaign, and it is expected that the Democrats will not lose the opportunity to point out that a major opponent of Government in business is president of a company borrowing money from the Government.

The answer will be that Gabrielson doesn't own a share of stock in Hydrocol and that none of the companies in which he does have an interest owes a cent to the RFC. The RFC loan to Hydrocol was urged by the Interior, Army and Navy departments because of the importance of the project to national defense.

this week

TRENDS—Stocks of kerosine, distillate, and residual in all areas east of California are 987,000 bbl. less than at this time last year. . . . For the same areas, stocks of crude and four major products decreased 89,000 bbl. daily from July 31 to September 17 compared with an increase of 433,000 bbl. daily in same period last year. . . . East-of-California stocks of crude and four products decreased 2,106,000 bbl. from March 31 to September 17 this year. . . . Last year, these stocks gained 51,511,000 bbl. in the same period. . . . ¶Distillate markets continue firm with price increases in Mid-Continent areas. . . . Natural gasoline increases 0.25 cent per gallon. . . .

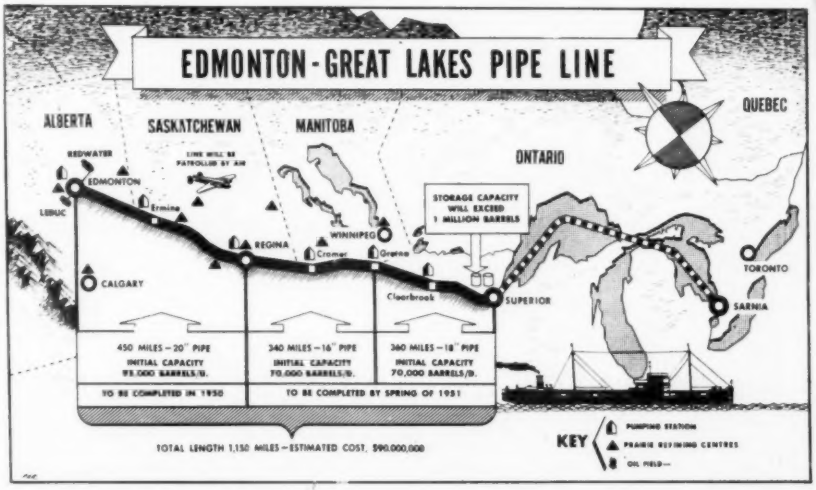
INDUSTRY—Trend toward hand-out state and Louisiana taxes draw criticism from oil men at New Orleans meeting of oil men. . . . Pursuit of subsidies, gifts, and loans will cause decline of civilization, Hallanan tell listeners. . . . ¶William R. Boyd, Jr., announces decision to retire following November meeting of A.P.I. . . . Successor as yet unknown. . . . ¶United States oil industry still concerned over effects of pound devaluation. . . . No. 1 question still is whether British companies will raise prices of sterling oil. . . . ¶Carthage Hydrocol to increase financing of oil-from-gas plant at Brownsville. . . .

REFINING—Refinery-expansion plans completed by Pan-Am Southern Corp. . . . New facilities at El Dorado, Ark., refinery to include 9,300-bbl.-per-day delayed-coking unit. . . . ¶Construction at Shell Oil Co. of Canada, Ltd.'s Montreal East refinery will increase crude-charging capacity by 80 per cent. . . . Work is progressing on catalytic cracking unit. . . . ¶British American Oil Co., Ltd., will add deasphalting unit to its Clarkson, Ont., refinery. . . . ¶Prolonged strike at Crown Central Petroleum Corp.'s refinery ends as union workers ratify new working contract. . . .

PIPE LINES—Great Lakes Pipe Line Co. awards contracts for 261 miles of 12-in. between Des Moines and Minneapolis. . . . Work is scheduled to begin in October. . . . ¶Work is now under way on laying of Mid-Valley Pipe Line Co.'s 1,000-mile line from Longview, Tex., to Lima, Ohio. . . . ¶400-mile Cities Service Gas Co. natural-gas line from Kansas-Hugoton field to Kansas City is completed. . . . ¶Aluminum-alloy pipe is proposed for new lateral line by Alabama-Tennessee Natural Gas Co. . . .

INTERNATIONAL—Crude-oil prices in Middle East are reduced 13 cents per barrel, bringing Persian Gulf 36° gravity oil to $1.75. . . . ¶Application for shipment of $500,000 worth of drilling equipment to Russia reported approved by Commerce Department. . . . ¶Colombian Petroleum announces plans to open Rio de Oro shut-in wells. . . . Company to drill deep Cretaceous test in area, near Tibu field. . . . ¶Qatar field on Persian Gulf to begin commercial production with completion of pipe-line outlet in January. . . .

GOVERNMENT—Kansas district judge upholds power of Conservation Commission to establish a minimum wellhead price for natural gas in Hugoton field. . . . ¶Canada's Board of Transport Commissioners refuses to approve application for permit to build natural-gas line from Alberta to Vancouver and south into the United States. . . . ¶Bureau of Mines releases Corps of Engineers survey showing four states have coal, shale, and gas sufficient to produce more than 9,000,000 bbl. of synthetic fuels daily for 40 years. . . .



Details of Interprovincial Pipe Line Co.'s 1,150-mile crude line from Edmonton to the Great Lakes are shown on this map. While costing an estimated $90,000,000 over the route shown, the company estimates it will save $10,000,000 by not taking the line across the broken route to the Canadian lakehead. Storage is to be built in Superior, Wis., to permit winter accumulation of oil, which will be carried by tanker to southwestern Ontario refineries during the seven ice-free months (Imperial Oil, Ltd., sketch)

Taxes, Federal Policy Are Chief Topics in New Orleans Meeting

by Leigh S. McCaslin, Jr.

NEW ORLEANS.—The "welfare state" and Louisiana taxes were twin targets last week at the annual meeting of the Louisiana-Arkansas division of the Mid-Continent Oil and Gas Association.

"The men of the oil industry know that whenever the pursuit of government subsidies, gifts, loans, and handouts becomes dominant in our thoughts, then our civilization will be in its decline." This was the comment of Walter S. Hallanan, president of Plymouth Oil Co., Pittsburgh, in his address delivered at the association's banquet.

Louisiana Taxes Highest

On the subject of Louisiana taxes, C. H. Lyons, an independent operator of Shreveport, told the group: "Our own state has set the pace in tax increases. With a recent increase of 52.8 per cent, Louisiana has the highest taxes in the nation. Not only is our per capita tax of $92.19 the highest in the nation, but in proportion to the income of our citizens we collect 50 per cent more taxes than does any other state." Lyons warned that "Our industrial growth could not have taken place under the present tax laws. And unless the tax laws are changed to encourage initiative and efficiency, we shall disappear as a great industrial nation."

In addition to the "welfare state," Hallanan emphasized the question of increased imports of crude oil. Unlike many, the National Petroleum Council president called for federal intervention only as a "last resort."

He called for solution of the problem "within the industry." "I have felt very strongly," Hallanan said, "that there ought to be enough vision and statesmanship within the industry to solve this problem. Unless the representatives of all sides to this question can demonstrate good faith and find common ground, then the industry will be found wanting. It will not live up to its best traditions. Indeed, it will not keep faith with its own declaration of policy with respect to imports as promulgated by the National Petroleum Council.

"It seems to me that if the representatives of every division of the industry can get together in unanimous agreement on a statement of policy, those same representatives ought to be able to carry that policy into effect. In any event, I think it would be a mistake to call a policeman to settle a family quarrel except as a last resort. The danger is that the officer might decide to stay permanently. We cannot afford that without serious compromises of our convictions with respect to government controls."

Above: H. C. Teasdel, California Co., New Orleans; F. C. Brown, Shell Pipe Line Co., Houston; and F. M. Porter, of Fain-Porter Drilling Co. Left: A. B. Carmody, North Central Texas Oil Co., Shreveport, who was re-elected president, and Frank W. Bruner, Carter Oil Co., Shreveport

An unusual aspect of the 2-day meeting was the defense of the so-called "majors" by two independent operators. Lyons told a press luncheon the large integrated companies "are often misunderstood." "Many people," he said, "confuse bigness with monopoly. There is no evil in mere bigness."

Anderson Is Speaker

R. B. Anderson, independent of Vernon, Tex., and president of the Texas Mid-Continent Oil and Gas Association, said: "We should not become alarmed at conflicts and differences of opinion within the industry, because they are the marks of the dynamic, competitive energy within this business which is the most progressive in the world. . . One of the first steps in an organized assault against the petroleum industry of the United States will be that of 'dividing the big 'uns and the little 'uns.' Many methods will be used to convince the so-called little producer that the rest of the industry is ganging up against him and that he should be protected by a special set of laws and a special bureau."

Paul Cain, district representative

FIGURES released by the Louisiana-Arkansas division of Mid-Continent Oil and Gas Association give this picture of Louisiana taxes for the 1948-49 fiscal year:

Per capita taxes amounted to $92.19, the highest in the nation paid to the state.

Based on a Department of Census survey, Louisiana taxes per capita were $326, a 32.5 per cent deduction from a per capita income of $1,002.

Severance taxes from oil amounted to approximately $48,000,000; leases, royalties, and bonuses paid to the state totaled more than $27,000,000; gasoline taxes accounted for an additional $38,000,000; and gas gathering taxes added $4,000,000. Additional millions were collected in property taxes and corporation and individual income taxes derived from oil operations.

Taxes on oil and gas operations and on the sale of gasoline account for more than 50 per cent of the state's total income.

The petroleum committee of the New Orleans Association of Commerce added fuel to the fire last week with a report of decreased oil activity. The committee blamed this lessening of activity on the increase in severance taxes on crude oil which was levied by the 1948 legislature. There were 29 fewer geophysical crews operating in the state during the fiscal year ended June 30 than in the previous year, the committee said. In addition, wildcat drilling activities have decreased about 30 per cent since the middle of 1948, according to the group.

In a jovial mood at the New Orleans meeting were C. H. Lyons, of Lyons & Prentiss, Shreveport, a vice president of the division; R. B. Anderson, general manager of the W. T. Waggoner Estate, Vernon, Tex., and president of the Texas Mid-Continent Oil and Gas Association, and Charles A. Hazen

in Dallas of the Fred Eldean organization, reemphasized one of the dominant themes of the meeting when he attributed the "beachheads of socialism" in the United States to public misunderstanding. He said that the "leftist group" knows that Congress is not going to pass a bill which will nationalize the oil and gas industry. However, Cain pointed out, this group is attempting to create and consolidate small gains toward complete nationalization.

The New Orleans meeting was opened by A. R. Carmody, president of the group, with the statement that "taxes are mounting at such a rate that the time is coming when capital will be afraid to venture in an area where gains are kept at a minimum."

In the closing session of the meeting, Carmody was reelected president, and Sam S. Caldwell was reelected executive vice president and secretary-treasurer. Vice presidents reelected were: John J. Frommer, Joe T. Goodman, C. H. Lyons, A. H. Tarver, and A. H. Weyland, all of Shreveport; C. H. Murphy, Jr., El Dorado, Ark.; W. H. Rector, Little Rock, Ark.; and R. L. Keyes, H. C. Teasdel, and William Helis, Jr., all of New Orleans.

The executive committee adopted a resolution approving the efforts of the Louisiana Conservation Commission to work out a state-wide secondary-recovery program. The resolution approved such efforts where "it is proven economically feasible."

Turbine-Driven Automobiles Seen as Future Development, A.S.M.E. Is Told

ERIE, Pa.—A prediction that gas turbines will be developed for automobiles, replacing the conventional piston engines, was made to the American Society of Mechanical Engineers meeting here September 29 by Frank L. Schwartz, professor of mechanical engineering at the University of Michigan.

Gas turbines will be smaller, lighter, and cheaper than present automobile motors, he said, and will have fewer moving parts, low oil consumption, no need for antifreeze, smooth operation, elimination of automatic transmissions, and will burn low-grade fuels which do not require a high degree of refining.

Schwartz revealed that while no announcement has been made of an automotive gas turbine in the United States, several companies are experimenting with small models and they have been under development in foreign countries for several years. He conceded that there are many problems to be solved before the gas turbine replaces the present type of automobile engine, but declared that research to date indicates that progress is being made toward solution of all of them.

Another prediction that coal-fired turbines will equal or better diesel locomotives for railroad use was made to the A.S.M.E. meeting by John J. Kane, development engineer of Standard Stoker Co., Inc., Erie. He described three current experiments with turbine locomotives using gas turbines or steam turbines combined with electric drives and both fueled by powdered coal, and predicted that the possible future scarcity of diesel oil will speed development of this type of railroad prime mover.

Natural-Gasoline Plant For Alberta Projected

Alberta should have its first natural-gasoline plant outside of Turner Valley within the next year. Site for the new plant is in the Hanna area, about 95 miles northeast of Calgary.

Irving B. Chittenden and Associates, representing Chloro Gas Products Co., Long Beach, Calif., announced the completion of arrangements with Hanna Petroleums, Ltd., of Calgary to erect a plant at the Hanna-Dowling No. 1 wet-gas discovery well. The Dowling well previously showed an open flow potential of approximately 21,000,000 cu. ft. of natural gas daily, with a 1.46 gal. per thousand rate.

Under the terms of the agreement approximately 1,000,000 cu. ft. of gas will be processed each day and purchased by Chloro Gas Products from Hanna.

Money Controls Hamper Industry, Holman Says

WASHINGTON.—Foreign nationalism and currency controls are discouraging United States investors, Eugene Holman, president of Standard Oil Co. (N.J.), said here September 27.

"As members of an industry that provided four-fifths of the private investment made by American interests abroad last year—totaling one and one-half billion dollars—we are disturbed by the worsening of the investment climate in many countries," he said.

Holman's views were contained in a statement prepared for delivery before a subcommittee of the joint congressional economic committee studying the problems now facing potential foreign investors.

A United States policy which will encourage private investment abroad would be strongly supported by the oil industry, he said. Government assurance of fair treatment abroad, he said, would be one of the best courses of action to take.

"This," he asserted, "would help to strengthen friendly nations and to lessen their social and political problems."

At the present, Holman said, oil companies are unable to sell oil for pounds sterling because of their inability to convert the pounds.

"Some countries," he said, "though unable or unwilling to pay dollars for petroleum, would be able and willing to pay American companies in sterling. We on our side would be willing to accept sterling payment provided we were able to put these funds to use.

"We do not believe that permitting us to operate in sterling would occasion any important dollar drain on the United Kingdom."

Holman said he hopes that current discussions in Washington will "establish a basis on which American oil companies can work out with the British Government a solution to these problems."

New Methods Promise Greater Oil Recovery, A.I.M.E. Is Told

COLUMBUS.—Large additional recoveries of crude from fields which have been nearly exhausted by previous secondary-recovery programs can be obtained by methods now under experiment in Bradford field, Pennsylvania, it was reported in a paper presented to the midyear meeting of the American Institute of Mining and Metallurgical Engineers here September 27.

John F. Buckwalter of Ryder-Scott Co., Bradford, declared that a property should not be considered "watered out" and worthless even though it has been pattern-drilled and flooded for 5 or 10 years, and that since 1944 nearly 1,000 wells have been drilled in Bradford field on properties previously developed by five-spotting and pressure flooding.

As a check on the new methods he described a tract of 102 acres which produced 2,500 bbl. per acre on flush production, 1,400 bbl. per acre with haphazard water flooding, and 2,700 bbl. per acre with a five-spot pattern flood. Two of the new methods used on this tract are estimated to yield an additional 3,500 bbl. per acre, he declared.

The first plan involved simply drilling additional producing wells between intake wells and continuing to use all of the oil input and producing wells. The second plan used was to plug the old input wells which, Buckwalter said, were failing to drive all the oil to producing wells. New input wells were drilled 50 ft. away and were shot with seven times as much nitroglycerin as was used in the original input wells. The old five-spot producing wells were deepened and reshot and recompleted.

Buckwalter also told of other experiments in reworking old fields in the Bradford area, but concluded that to date these do not promise as great ultimate recovery as the two he described in detail.

Application for Gas Line From Alberta Is Refused

Canada's Board of Transport Commissioners has refused Westcoast Transmission Co., Ltd.'s application to build a natural-gas pipe line into Vancouver, B. C., from Alberta, and across the international border to Portland and Seattle. The board refused the permit on grounds that the company did not show sufficient evidence it could build such a line.

In declining the application, Justice M. B. Archibald, chairman of the board, said the firm had not shown there were sufficient natural-gas reserves in northern Alberta to support such a pipe line. Alberta had given no indication it would approve a permit to export natural gas in any case, he added.

Sen. J. W. de B. Farris of British Columbia, a director of Westcoast Transmission, asked that the firm be granted permission to run that section of the line from inside British Columbia to Vancouver and across the border, and Justice Archibald said he would have to consider the form in which such a request might be made.

WORLD'S MOST TRAVELED RIG

This drilling rig, now located at Point Barrow, Alaska, seems to have a clear-cut claim to the title of the world's most traveled rig. When it is moved inland to begin work on the Navy's petroleum reserve it will have completed an itinerary covering almost 25,000 miles. Built in 1941, it was first moved by Superior Oil Co. onto a California location. Then it went to New Zealand, in 1942, for exploratory drilling near Lyttleton, South Island. After several dry holes the New Zealand project was abandoned and the rig was returned to Los Angeles Harbor a month after D-day in Europe and placed in Army custody. Its latest job will be drilling exploratory wells on the Navy's Petroleum Reserve No. 4

Krug, Stratford Take Opposite Shale-Oil Views

RIFLE, Colo.—A foretaste of a bitter fight between the oil industry and the federal Government on the issue of the commercial application of experiments in producing oil from shale was seen in the expression of opposing views at the public opening at the U. S. Bureau of Mines experimental oil-shale plant here September 21.

Secretary of the Interior J. A. Krug told the party of invited guests that the successful operation of the small experimental pilot plant "marks the birth of a new and tremendous industry which will assure us a plentiful supply of oil for many generations."

The Interior Department, he said, is pushing for enactment of legislation to provide for government construction of a number of large-scale plants to mine oil shale and retort the oil from it, and "if the oil industry will not take the first step we must go ahead with the building of these plants."

The oil industry's reaction to this was expressed by W. M. Stratford, president of Texaco Development Corp., New York, who observed, "I am impressed with the fact that it is easier to get oil to run out of the ground than to tear it out of the rocks."

While not directly attacking Krug's proposal, Stratford said: "It's a nice thing to have a backlog of shale oil in case we need it, but it's not sound thinking to consider a commercial operation today. For the same money you can drill a lot of oil wells."

Krug asserted that "regardless of what a lot of people think, our supply of petroleum is rapidly being used up," and the nation can't wait forever for an industry that would take 10 years to build in case of an emergency shortage of petroleum.

WASHINGTON WATCHING

BY BERTRAM F. LINZ

None for the Reds

WASHINGTON.—Communist forces now control China but they will get no support from the United States, or from any other democratic country if this Government can prevent it.

Spearheading a move to starve the communists out, the Department of Commerce will shortly announce that special licenses will be required for any shipments to China of oil or other important commodities or products.

It is understood that Britain also has agreed to apply economic sanctions against the Chinese communists and that other important sources of strategic materials, such as France, the Netherlands, Belgium, and the Philippines, will be invited to join the movement.

A recent survey by the State Department indicated that the Chinese reds have run into an acute petroleum shortage and cannot count on securing from Russia or Russian-controlled sources anywhere near the 5,000,000 bbl. a year which is estimated as their minimum requirement.

In their march across the country, the communists are believed to have seized more than 1,000,000 bbl. of oil from the nationalist government and private firms. Some 200,000 bbl. of kerosine and gasoline are reported to have been shipped from Romania this summer, and a barter arrangement with Russia calls for the supply of some oil, but the volume is not believed to be very great. Domestic production, from the shale-oil refinery at Fushun, Manchuria, is reported as only 100,000 bbl. a year.

While nobody expects that the cutting off of supplies of oil and other vitally needed commodities will drive the communists out of China, it will serve to make things very difficult for them and might contribute to a resistance movement when the Chinese people find the reds can't make good on their promises that everybody will have everything under the hammer and sickle.

Tidelands Again

A NEW series of hearings on tidelands legislation is expected to be held early next month, this time by the Senate interior committee of which Sen. Joseph C. O'Mahoney of Wyoming is chairman.

Last month a House judiciary subcommittee held a 3-day hearing on the two bills now pending, and then suspended the issue indefinitely.

There is no chance whatever of congressional action on the subject this year, and no assurance of action next session although administration is expected to bring it up if congressional leaders are confident they can control enough votes for full federal control and management of the underwater oil reserves.

O'Mahoney, who participated in some of the discussions sponsored this summer by House Speaker Rayburn of Texas which resulted in the writing of two bills, one by the Interior and Justice departments providing for federal administration and the other by state officials calling for state control of operations in the offshore areas, finally wound up by disapproving of both and announcing he would press his own measure which also calls for Government control.

Action on the legislation was held up this year because the proponents of state control were confident they could put over their measure, although not claiming they could secure its passage over a presidential veto, while the administration forces feared the opposition could defeat their bill for federal administration.

Should both sides hold firm next session, action on the issue might again be deferred in the hope that next year's congressional elections might result in changes in the lineup which would give one side or the other definite advantage.

German Question

INCREASED pressure to halt the dismantling of Germany's oil and rubber plants is being exerted both in and outside of Congress, where it is contended that if the present program continues heavy unemployment and lack of vital products needed by Europe will result.

The entire group of plants centered around the Fischer-Tropsch process is to be dismantled, although very little of this production has any use for war purposes and the chemical raw materials produced are the very life of a number of reprocessing industries.

Destruction of the gas-generating plant will reduce the already short supply of gas for the German population, it is contended, and removal of the distilling plants will make it impossible to produce gasoline from imported crudes so that new plants will have to be erected for this purpose. The German people are also at a loss to understand why the production of buna by the Fischer-Tropsch process is to be stopped in Germany when it is allowed to remain in production in Japan.

There is also protest over dismantling of plants producing synthetic rubber, including those producing butadiene, its primary material which is greatly needed for the manufacture of floor coverings and wall boards for home construction. The German people, it is said, find it hard to understand why this process for making synthetic rubber, which they invented, is to be taken from them when they need it so greatly for peaceful purposes.

Members of Congress who are protesting the program are securing their strongest support from the American Federation of Labor, which consistently has taken the position that the best safeguard against instigation of another war by Germany is to accept her as a coworker in European economic rehabilitation and as one of the countries to be rehabilitated.

International Problem

CURRENCY devaluation in more than a score of countries is making more difficult the talks on petroleum now going on between oil experts of Britain, Canada, and the United States.

Following the announcement of Britain's devaluation the suggestion was made that the conversations be suspended temporarily, until the effects of currency changes on world prices and costs became clearer, but when the idea was reported to London word came back that the meetings not only should be continued but should get down to fundamentals quickly.

The conference, designed to develop the matters to be discussed at later meetings of top-level officials of the three countries, is said to be making some progress, but how much is a closely guarded secret, as are the specific subjects which are being studied.

It is understood, however, that the English delegation is asking practically unlimited access to all world markets. The United States representatives are opposing this because of the very definite advantages which the cheapened pound would give the British companies, and are sticking closely to the announcement made at the close of the tripartite monetary conferences that due regard would be given in solving oil problems to "the protection of legitimate interests

(Continued on page 131)

Doheny Sale Affords Yardstick For Large-Property Evaluation

by Robert Harwick

LOS ANGELES.—Nassau Associates, Inc., New York, subsidiary of Dillon, Reed & Co., handed Mrs. Carrie Estelle Doheny, widow of Edward L. Doheny, a check for $35,500,000.

This sum purchased her one-quarter interest in 1,325 acres of producing leases (2,000 total) in Coalinga Nose pool, Fresno County, California.

Total present production from the properties is 22,518 bbl. per day, so 5,630 bbl. daily is being run from the one-quarter interest sold. A small part of the same deal was the transfer of Mrs. Doheny's one-quarter interest in properties in the Pleasant Valley and Guijarral Hills pools. These lie within the few miles separating Coalinga Nose from the big Kettleman Hills pool to the southeast.

The sale is the largest money deal for producing leases in about 20 years. Also, on the basis of dollars per acre, it probably hits the all-time high for any oil property, anywhere, of substantial size.

The sale not only brings to attention a posthumous success chapter in the oil career of Edward C. Doheny, but also focuses attention to the carefully planned and engineered development of the Coalinga Nose properties which are under the direct management of Robert S. Lytle, operator, Los Angeles.

In the 10-year development of the leases, for example, the producing formation in each of the 64 wells was completely cored, and detailed core analyses run for one in each quarter section. The analyses, incidentally, provided valuable data for the evaluation which came up prior to making the sale of the Doheny one-quarter interest.

Discovered in 1938

The Coalinga Nose discovery well was completed by Lytle in May, 1938. The operator ran three rigs continuously in the ensuing 10-year development program.

Other one-quarter interests in the properties are owned by Seaboard Oil Co. of Delaware, Honolulu Oil Corp., and Los Nietos Co. The latter concern is owned by the Doheny grandchildren and the ownership is reflected in the Spanish name.

The Coalinga Nose properties of the above group (see map) are now fully developed, with all 64 wells flowing naturally. Well depths to the main Gatchell sand (Eocene) vary from 6,600 to 7,700 ft. The producing sand thickness runs from a maximum of 700 ft. near the center down to a feather edge outside the border of the proposed field unitization limits.

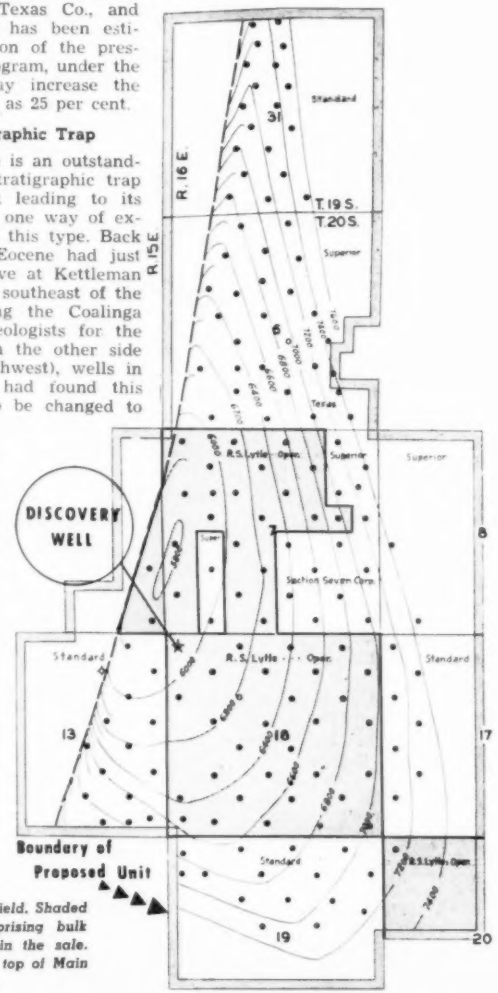
The unit plan which has been proposed for this pool includes pressure-maintenance operation. Participants in the plan, along with the companies represented by Robert S. Lytle, operator, are Standard Oil Co. of California, The Texas Co., and Superior Oil Co. It has been estimated that application of the pressure-maintenance program, under the unitization plan, may increase the recovery by as much as 25 per cent.

Field Is Stratigraphic Trap

The Coalinga Nose is an outstanding example of a stratigraphic trap structure, and work leading to its discovery points out one way of exploring structures of this type. Back in 1937 the upper Eocene had just been found productive at Kettleman Hills, some 12 miles southeast of the land now comprising the Coalinga Nose production. Geologists for the group noted that on the other side of their leases (northwest), wells in the Coalinga field had found this Eocene formation to be changed to a shale facies. Therefore, they concluded, the Kettleman Hills Eocene sand could extend on as sand under the area in question and be productive—as there was a predictable possibility of a wedge-like sand-shale trap being present under the leases. Drilling by the group confirmed this geological prediction, and the field was discovered. Since the discovery about 70,000,000 bbl. of oil have been produced from the Doheny-Seaboard-Honolulu leases.

The Doheny sale of 6,000 bbl. daily production for $35,500,000 affords a prominent yardstick as to current evaluations of large oil properties. Considerable detailed information is available on these leases, as only a few months ago Tide Water Associated Oil Co. scheduled a series of stockholders meetings to approve purchase of these same properties for $43,000,000, with the optional contract predated back to an effective sale date of October 10, 1948. Of this price, $42,000,000 value was assigned to the Coalinga Nose properties. The purchase option was not executed by Tide Water due to lack of stockholders quorum at the meetings scheduled to consider the proposal.

The data submitted for the Tide Water stockholders information revealed that DeGolyer & MacNaughton, Dallas, had estimated the re-



Map of Coalinga Nose field. Shaded areas are leases comprising bulk of properties involved in the sale. Contours are drawn on top of Main Gatchell sand (Eocene)

serves as of October 10, 1948, at 36,000,000 net barrels under efficient operation, with a future ultimate production of 40,000,000 net barrels possible if the field became unitized. Tide Water's petroleum engineers estimated that in addition the reserves of natural gasoline to be produced would equal 1,825,000 bbl. and that the natural gas reserves amounted to 37 billion cubic feet.

Coalinga Nose oil production is 32 gravity and present market price is $2.54 per barrel. Royalties applicable to the leases average 16 per cent. The Tide Water proposal of $42,000,000 thus amounted to a reserve cost in the ground of $1.17 per barrel on the basis of estimated reserves of 36,000,000 net barrels. Tide Water estimated the current cost of production to be 15 cents per barrel average. On the basis of estimated reserves of 40,000,000 net barrels, the cost in the ground figure for the reserves would have been $1.05 per barrel.

The one-quarter interest purchased in the Pleasant Valley properties represents some 160 proven acres (1,000 acres total) and six producing wells; the Guijarral Hills leases have 640 gross acres and contain six wells. The latter leases are not yet fully developed and have about eight well locations remaining.

Prior to the sale Tide Water had been purchasing the oil produced from the interest sold. At the time of the proposed purchase by Tide Water this had amounted to 15,603,600 bbl., including some of the royalty oil. This oil was run to Tide Water's Avon, Calif., refinery. Nassau Associates have announced a long-term contract with Union Oil for the purchase of the production that they now control.

Transfer is Approved

WASHINGTON.—The Bureau of Land Management last week approved the assignment of the Carrie E. Doheny interests in Fresno County, California, oil leases on both private and public lands to Nassau Associates, Inc., of New York.

The bureau disclosed that the transfer was arranged by Acting Director Roscoe Bell over a coast-to-coast telephone hookup between attorneys for private and federal interests in Washington and Los Angeles.

No Ground Lost by Oil Industry in 3 Years, Public-Opinion Survey Shows

BUSINESS in general is not as well thought of as it was in 1946, but the oil industry is an exception.

This is indicated in the results of a study recently completed by Opinion Research Corp. for the Oil Industry Information Committee.

The public, the survey showed, holds the oil industry in about the same opinion it did 3 years ago. This is considered a "creditable" showing in view of the loss of public favor suffered during the past 3 inflationary years by industry in general.

However, the oil industry found, there still is a lot of misinformation and considerable antagonism among segments of the population.

Higher gasoline prices drew the greatest increase in public opposition, with a third of the persons polled saying prices now are too high. Only one in nine thought so in 1946.

The survey also revealed that more than half the persons polled think oil companies get together and set prices, and 22 per cent believe the oil industry is a monopoly.

Other criticisms of the industry which showed an increase in the percentage of persons polled included: lack of competition, high profits, and not trying to serve the best interests of the public.

On the favorable side, the industry found that more than two out of three people say their general impression of the industry is favorable; three out of four say the industry tries to serve the best interests of the public; a large majority consider the industry "progressive;" and almost two out of three say that oil companies try to conserve oil resources.

The survey indicated there is little difference in the opinions expressed by different classes of people. Geographically, it showed that residents of the oil-producing states of Arkansas, Louisiana, Oklahoma, New Mexico, and Texas think more highly of the industry than do residents of other areas.

The research organization emphasized that the survey attempted only to appraise the present state of public opinion of the oil industry as contrasted with 1946. It made no attempt to determine or evaluate the factors which produced the composite results.

HOW THEY VOTED

On the Good Side

	Per cent
Industry is progressive	65
It serves the public's best interests	75
It conserves oil resources	60+
It improves its products	75+
It is the most courteous	55

On the Bad

Gasoline prices are too high	33+
Profits are too great	30
It holds back new developments	30
Prices are fixed	50+
Industry is a monopoly	22

Oil Progress Week to Be Widely Observed

OIL Progress Week will be widely observed October 16 to 22 by ceremonies and activities of many sorts as the planning is being done entirely on the community level and is limited only by imagination and initiative of the local communities.

Heading up the movement is the Oil Industry Information Committee and its regional offices which last year staged an Oil Progress Day which was observed on a nation-wide basis, but this year the O.I.I.C. is simply sending suggestions to local groups and is making no effort to direct their activities.

As a result the observances will vary greatly in character and elaborateness. Most programs, according to reports reaching O.I.I.C. offices, will include window displays, exhibits, radio talks, and speeches at special luncheons or other gatherings, but a good many novel features are expected to be developed in several cities.

Special programs in the schools are planned in many places, including industry movies, educational material, and essay contests. Open house will be held some time during the week at many refineries, laboratories, and equipment-manufacturing plants. Mayors are preparing to issue Oil Progress Week proclamations in many cities, and in a number of communities there will be parades and street decorations.

Banker Buys Control of States Oil Corp.

FORT WORTH.—Controlling interest in States Oil Corp. of Eastland, Tex., which produces about 90 wells in Coleman County, has been purchased by M. E. Daniel and associates. Daniel is president of the First National Bank of Breckenridge.

Consideration and amount of stock purchased were not announced.

States Oil, an active West Texas producer since 1918, will continue to maintain its headquarters in Eastland. No changes in operating personnel were expected.

Eleventh Flare-Gas Order Dissolved; Only Five Left

AUSTIN.—District Judge Charles O. Betts has dissolved the injunction granted operators in South Caesar field, Bee County, restraining the enforcement of the Railroad Commission's flare-gas order.

This is the eleventh of 16 suits which the state has won in its flare-gas fight. Flare orders still under injunction are those involving Goldsmith, Levelland, McElroy, Seminole, and Wasson fields.

International

WORLD-WIDE OIL DEVELOPMENTS

Middle East Crude Price Cut 13 Cents to $1.75 Per Barrel

MAJOR producers in the Persian Gulf area have reduced their crude-oil prices 13 cents a barrel. The price change was initiated before the British Government's devaluation of the pound sterling.

First to make the reduction was Middle East Crude Sales Co., Ltd., a member of the Caltex group which controls 60 per cent of the Saudi Arabian output.

The f.o.b. price at Ras Tanura was lowered from $1.88 to $1.75 a barrel for 36°-gravity oil. The cut was effective September 7 but did not become generally known until last week.

Standard Oil Co. (N.J.) through its Esso Export Corp. and Socony-Vacuum Oil Co., Inc., holding 30 and 10 per cent respectively interest in the Arabian operation, followed with a reduction of the same amount.

In the north of the Persian Gulf, Anglo-Iranian Oil Co., Ltd., reduced its price of 33°-gravity crude to $1.69. This is the gravity of oil lifted at Bandar Mashur, and the new price, considering the customary 2-cent per degree gravity differential, conforms to that at Ras Tanura. Gulf Oil Corp., which controls half the production in Kuwait—much of which is disposed of to Shell under long-term contract—has not changed its posting as far as was known.

The new crude price level in the Persian Gulf places this crude in a more favorable competitive position in Western Hemisphere markets, though by far the greater part of the Middle East production moves to consuming centers in Europe and elsewhere in the Eastern Hemisphere. Previous calculations showed that Middle East crude at prevailing tanker rates and the old price of $1.82 for 33° gravity could be laid down in New York for about $3.13 *(The Oil and Gas Journal, August 11, page 52)*.

Reports in New York were that the Persian Gulf price reduction had been prompted by competitive conditions among the producers.

Overshadowing these price changes, however, was the confusion created in international oil markets by the British Government's action in devaluating the pound by 30.2 per cent to $2.80. It was emphasized that the 13-cent reductions in Persian Gulf crude had preceded devaluation and were unrelated to it.

There has been discussion recently among American company officials over a freight differential between Arabian crude on the one hand and Kuwait and Iranian oil on the other. This differential would operate against Kuwait and Iranian oil but has not been recognized by the operators in the northern part of the Persian Gulf. Based on 60 per cent of the U. S. Maritime Commission rates, it would amount to about 3 cents for Kuwait crude and 5 cents for Iran.

Rigs for Russia Reported Approved by Government

The U. S. Department of Commerce was reported last week to have approved an application for the shipment of $500,000 worth of oil-well drilling machinery to Russia.

It was said the $500,000 rig order had been made more than a year ago. It was reported that the order represented diesel-electric rig quipment, including draw works, rotary table, and electrical equipment. Another order for steam-driven rig equipment is still awaiting approval of the department.

Romanian Oil Industry Fails to Meet Its Goal

The oil industry of Communist-dominated Romania failed to meet the goals set up for it the first two quarters of this year, according to a broadcast of the Bucharest radio.

The report of the Romanian Council of Ministers on the country's over-all production blamed shortages and equipment and poor production technology for the lag in oil output.

Romania's oil industry, the most important in Europe, is believed to be producing about 80,000 bbl. daily.

Kuwait Crude Outlet Via Tapline Discussed

PRELIMINARY discussions on the feasibility of giving Kuwait oil production an outlet through the Tapline have been taking place between representatives of Trans-Arabian Pipe Line Co. and Gulf Oil Corp.

A Trans-Arabian official said there had been no negotiations for acquisition of a stock interest in the pipe-line company by Gulf but that there had been conferences on whether moving Kuwait oil through the Trans-Arabian line would be practicable from the engineering standpoint.

This would involve running a relatively short tiein line from Burghan field in Kuwait southwest to the Tapline route in Saudi Arabia. Such an outlet for Kuwait oil was, incidentally, called for in the original wartime plan for a government-owned pipe line by Harold L. Ickes, then Secretary of the Interior.

It was said that in the present discussions the two companies first want to determine if the scheme is practical. Then, presumably, a decision would be made as to whether Gulf would buy a share of Tapline or its oil would be moved on a per-barrel charge basis.

A big-inch line from Kuwait to the Mediterranean was one of the four major Middle East pipe lines projected shortly after the war. The Kuwait project was the last scheduled to be built and now apparently would be abandoned if a tiein with the Tapline is carried out.

Gulf Oil Corp. shares ownership of the Kuwait concession with Anglo-Iranian Oil Co., Ltd. Much of Gulf's part of the production is sold to Shell. The Tapline is expected to be completed early in 1950. It will carry some 300,000 bbl. daily which could be stepped up to 500,000 bbl. daily with additional pumping equipment.

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Oil, Chemical Firms Expanding Britain's Petrochem Industry

International

by V. S. Swaminathan*

THE future pattern of British petroleum chemicals industry began to take shape last year. It is being fostered by three types of organizations: (1) oil companies on their own account, (2) joint efforts of oil and chemical companies, and (3) chemical companies by themselves.

The first type is exemplified by Shell Petroleum Co., Ltd., with three major enterprises involving an outlay of several million pounds. These projects comprise a cracking plant at Thornton to produce 24,000 tons a year of aliphatic chemicals from olefins, prepared by a high-temperature cracking of an imported oil fraction; a wax-cracking and processing plant at Stanlow to manufacture 50,000 tons of the detergent "Teepol"; and the enlarging of Shell Haven refinery capacity to make 30,000 tons of products such as insecticides and other agricultural chemicals.

The second type is illustrated by British Petroleum Co., Ltd., the £5 million joint organization of Anglo-Iranian Oil Co., Ltd., and Distillers, Ltd., formed to operate at Grangemouth, Scotland. In between these two comes the Partington plant of the Petrochemicals, Ltd., handling 75,000 tons of crude oil a year by the Catarole process and marketing a wide range of aliphatic chemicals and aromatic hydrocarbons. Further exploitation of the company's products is being undertaken in cooperation with its four major customers, Lewis Berger, Erinoids, British Paints, and Lankro Chemicals. The £22 million Wilton Works near Middlesbrough, belonging to Imperial Chemical Industries, Ltd., represents the third type of organization. All these plants create an industry which more nearly reflects the importance already gained by petroleum chemistry in the United States. But in Britain the industry is being developed independently, or substantially so, of the current expansion of domestic oil-refinery capacity.

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Under Way 3 Years

At Wilton, Imperial Chemical Industries decided on two major activities, the cracking of oil for the production of basic organic chemicals and electrolysis of brine for the production of chlorine and caustic soda. The company started looking for a site on the south bank of the Tees as early as 1943, and work on the project has been in progress for more than 3 years.

The greatest single project in I.C.I.'s £80 million postwar expansion program, and the largest single undertaking ever in Britain's chemical industry, was sited at Wilton for several excellent reasons. The northeast coast offers easy access to the company's vital raw materials and easy egress for its finished products to all parts of Britain and the world by road, rail and sea. There are close at hand abundant supplies of coal and salt, ample water, first-class communication facilities and a population of 350,000 from which to draw workers. Above all, the company's giant Billingham factory is on the opposite bank of the Tees, and the close proximity of these two mammoth chemical plants is expected to prove of the greatest mutual advantage.

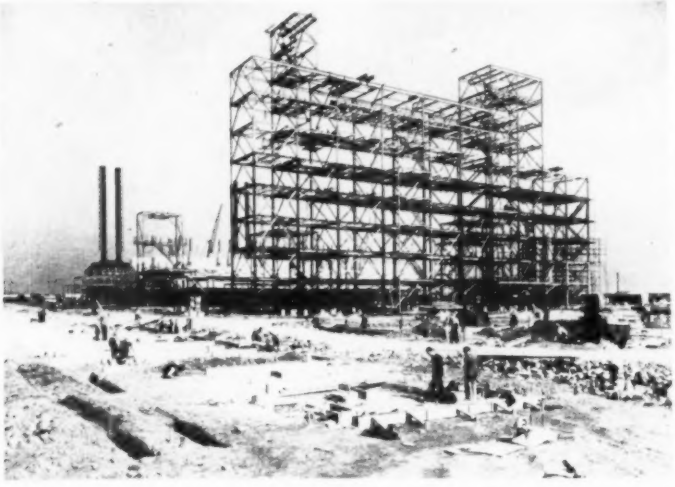
At Billingham I.C.I. already has a large stake in the production of organic chemicals derived from the hydrogenation of creosote oil. The Wilton oil cracker both extends this interest and provides the basic raw materials for a large new chemical enterprise. The main contract for the cracker was entrusted to M. W. Kellogg Co., New York.

The Wilton plant will charge 7,400 bbl. of naphtha and produce 212,000 lb. of ethylene daily. On the usual calendar-day basis this corresponds to an annual output of 35,000 tons of ethylene from 350,000 tons of liquid feed stock, which makes this undertaking one of the major ethylene producers in the world. The crude oil will come from the Middle East via ocean tankers. The Tees Conservancy Commission is constructing an oil wharf to accommodate the tankers, and alongside there is a tank farm whence the discharged crude will be pumped to Wilton.

Pipe Lines Connect Plants

The two important products of the cracking unit are ethylene and propylene. The former is to be used as the raw material of polythene, a plastic with excellent electrical properties discovered at the Winnington Works of the I.C.I.'s alkali division; ethylene glycol, the well-known antifreeze mixture; and the new textile fiber "Terylene," as well as synthetic detergents. The Wilton Works is connected to the Billingham plant across the River Tees by pipe lines 10 miles in length carried beneath the river bed through a 1,750-ft. tunnel.

Through the pipe line propylene will pass to the Billingham factory, where it will be converted into acetone via isopropanol. Acetone is vital for the manufacture of "Perspex" and as a solvent for paint and leather cloth, as well as an essential raw material in the manufacture of cordite. Wilton will also pipe butane to Billingham, where it will be blended in petrol, or sold as "calor" gas for



Construction under way on the huge Wilton Works of Imperial Chemical Industries. First section of the works recently was placed in operation

household use. A stream of mixed hydrogen and methane will also reach Billingham for use in preparing hydrogen and so saving coke in the manufacture of fertilizers. Lastly, motor spirit, amounting to 37,500,000 gal. from the cracker will, too, be piped to Billingham for blending with petrol produced there.

All the processes at Wilton are carried out at high temperatures, and some at very high pressures. When the present stage of development is completed about 500 tons of coal will be used daily in the boiler house, and steam raised at a pressure of 900 psi. Before being sent out into the network of pipes feeding the plants this steam will be passed through turbo-alternators to generate the bulk of the 30,000 kw. required for production. The remainder of electricity needs will be met by the North-eastern Electricity Board.

For cooling purposes arrangements have been made by the Tees Valley Water Board (T.V.W.B.) to furnish 42,000,000 gal. of water per week. This will be drawn from the River Tees and piped to Wilton Works' 6,000,000-gal. reservoir through 13 miles of main. Five million gallons more a week of purified water, mainly for the boilers, will also be supplied by T.V.W.B. Gas to Wilton comes from the Northern Gas Board.

Other major service items are being provided for transport and drainage. An extensive road and rail network (10 miles of roads and 15 of railways) is being built for moving raw materials and products to and from the factory. The drains now being laid will eventually lead into a main drainage culvert 7 ft. in diameter which can deal with a flow of 90,000,000 gal. per day.

40 Per Cent Complete

Plants now in operation produce "Perspex" sheet and phenolic molding powders. Wilton Works also makes polythene and urea molding powders. So far, nearly 40 per cent of the work for the above plants and services have been completed, entailing the erection of 8,000 tons of structural steelwork, the casting of 90,000 cu. yd. of concrete and laying of over 5,000,000 bricks. Nearly 2,000 men are at present on construction work and when the first-stage plants are ready they will employ 2,000 workers.

The process used on the Wilton "Perspex" plant incorporates the latest development in mechanical and automatic control to improve efficiency and productivity. The phenol formaldehyde resin and powder plants embody the most modern features in resin and molding powder manufacture and make full use of automatic control and mechanized handling to produce high-grade molding powders of consistent quality. When designing the plant, prime importance was attached to the elimination of the possibility of dust explosions, which are wont to occur with finely divided powders. The dust-handling equipment, enclosed conveyor systems, and special storage bunkers are particular features of the plant insuring safe operation and good working conditions.

A 300-ft. chimney and installations of cyclones and electrostatic precipitators for cleaning waste gases before they go into the chimney will insure that Wilton brings no dust or smoke problem to the community into which it is introduced.

In terms of national economy this relationship between the Wilton and Billingham plants will lead to domestic production of numerous chemical products vital to the country's future. It also means a significant saving in dollars inasmuch as both polythene and ethylene oxide have hitherto had to be made from molasses largely imported from the dollar area, and an increase in home production of high-quality petrol. The Wilton-Billingham complex will reap the economic advantages of a composite chemical factory embracing a great variety of chemical process.

International

Colpet to Open Shut-in Rio de Oro Wells, Plans Deep Cretaceous Test

COLOMBIAN PETROLEUM CO. is making plans to open up the shut-in Rio de Oro wells in the Barco concession in Colombia and to drill a deep Cretaceous test in the area next year.

Rio de Oro is about 40 km. north of the north end of Tibu field. Colpet earlier this year completed about half the length of a 4-in. pipe line, and further work to complete this outlet awaits dry weather in January or February.

The line thus far built was a northward extension of a gas line which led to an unsuccessful wildcat north of Tibu. The country is broken and hilly jungle. The airfield at Rio de Oro is being repaired and strengthened so that personnel and some equipment can be moved in in this manner.

The Rio de Oro, discovered in 1937, has nine wells with production from relatively shallow depths between 1,800 and 1,900 ft. The oil is 39° gravity. The development program in the area was halted following the outbreak of the war.

It is expected to be at least the second quarter of next year before the line is completed, the wells worked over, and other facilities provided for production. The existing wells are expected to produce 700 to 1,000 bbl. daily.

For the deep Cretaceous test, a heavy rig will be taken from among the seven operating in the southern part of the concession. It will be barged up the Rio Tarra into Venezuela and down the Rio de Oro to a location north of the present wells.

Barco's present production from Tibu and Petrolea is about 26,500 bbl. daily from both Tertiary and Cretaceous formations. The oil is moved to an outlet on the Caribbean at Covenas through the affiliated South American Gulf Oil Corp. 262-mile 12-in. pipe line.

Commercial Production In Qatar to Begin Soon

DESPITE some delays in receipt of French-manufactured line pipe, commercial oil production in Qatar in the Persian Gulf is expected to begin as scheduled next January.

Initial output is to be about 40,000 bbl. daily from 10 wells. The pipe line now being completed extends down the side of the anticlinal structure and to a loading point on the southeast coast of the peninsula.

The operations in Qatar, an independent shiekhdom, are by Petroleum Development (Qatar) Ltd., an associate of Iraq Petroleum Co., Ltd. The three producing wells drilled before the war were plugged when it was feared the area might be overrun.

Wells 4 through 11 in the Duhkan field have now been completed as producers except for No. 6 which was a mechanical failure. Two rigs are operating, now drilling Nos. 12 and 13 with No. 12 to be completed in the next few weeks.

The length of the pipe line is about 60 miles. It is 14½-in. in diameter and was designed by the late H. S. Austin, American consulting engineer to I.P.C. At the shipping terminal, two submarine lines are to be built. Five 93,000-bbl. tanks have been erected, two 130,000-bbl. tanks are nearly finished, and three more 130,000-bbl. units probably will be built.

Tankers of up to 34-ft. draft will be able to load at the Qatar terminal.

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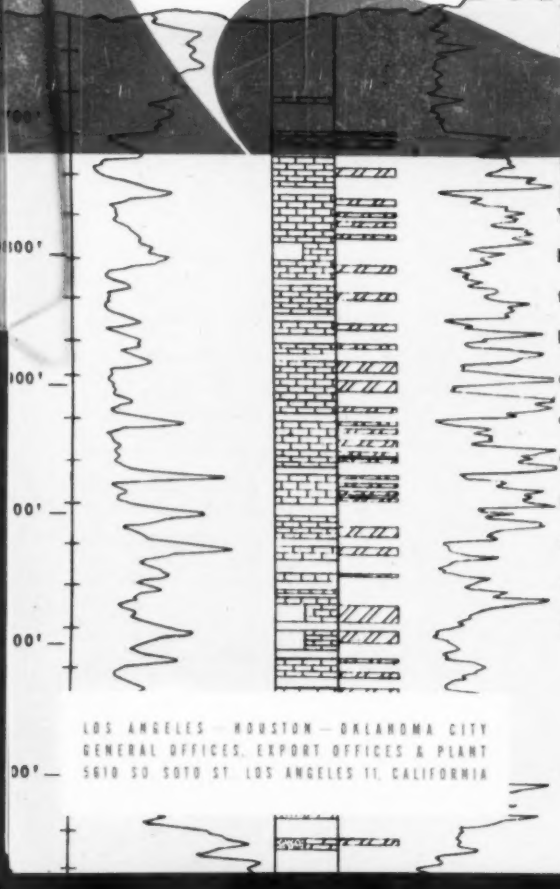

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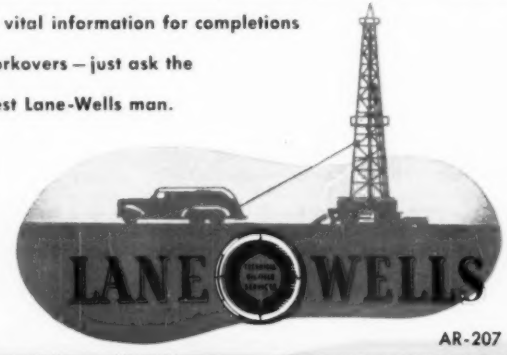

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AR-207

Senators Thanked for Imports Votes; Future Alarms Brown

WASHINGTON.—Senators who voted against the Thomas amendment to the Reciprocal Trade Act, providing for a quota on oil imports, received additional letters of appreciation last week from Gordon Duke of Southeastern Oil.

Duke told the 41 senators that independent marketers, especially those along the Atlantic Coast, "are opposed to restricting oil imports by such artificial devices as quotas, high tariffs, etc.," and prefer to see the natural laws of supply and demand operate.

While Southeastern Oil does not find it necessary now to import either crude or products, Duke said, there have been times in recent years when available domestic supplies were insufficient and imports had to be resorted to.

"We feel that rising demand in this country, without a corresponding rise in the development of new U. S. reserves of oil, will likely require us to depend partly on imports against it at a not-too-distant date," he said.

Brown Disagrees

Meanwhile, in a letter to President Fred W. Shield of the Independent Petroleum Association of America, Russell B. Brown, general counsel, referred to reports that a survey now being made by the State Department of company intentions to import foreign oil shows they propose to bring in approximately 750,000 bbl. daily of crude and products during the fourth quarter of this year.

Brown reported that Commerce Department figures showed that imports during July averaged 609,000 bbl. daily, of which 413,000 bbl. was crude and 196,000 bbl. products. This was 23,000 bbl. a day less than was imported in June, but well above the averages for the preceding 2 months.

The department's statistics showed that receipts from Saudi Arabia and Kuwait dropped from 103,000 bbl. in June to 74,000 bbl. in July, and that receipts from Colombia dropped 2,000 bbl., and from Mexico 8,000 bbl., but imports of Venezuelan oil increased 16,000 bbl. to a high for the year of 287,000 bbl. The bulk of the product imports was residual fuel oil from the Netherlands West Indies, 184,000 bbl. daily.

Brown pointed out that earlier this year an official of one importing company estimated that 1,000,000 bbl. daily would have to be brought in.

"His estimate was then based on a shortage in the United States," Brown said. "The shortage theory has been ended by the domestic producers. The principal basis remaining for an increase in imports, or even maintenance of the present rate, is simply that the importers want to do it that way."

Employe Plans Require Attention, Weldon Says

SHREVEPORT. — The requirements of security are basic and timeless but company programs for employe security need to be examined and modified frequently to keep them adequate, well rounded, and suited to current economic conditions, W. W. Weldon, assistant manager of the industrial-relations division of Esso Standard Oil Co., Baton Rouge, told a regional industrial-relations conference of the Western Petroleum Refiners Association here September 23.

For this purpose, he said, the parent Standard Oil Co. (N. J.) maintains a staff of experts to make a continuous study of the programs of its subsidiary companies for retirement annuities, thrift and savings, group insurance, sickness benefits, and accident benefits.

As a result of this, Weldon explained, the company's program started with an informal retirement provision in 1903 and its first written plan, in 1909, filled only one-half a page, but has now grown to an elaborate program which has won wide acclaim in assisting employes and their families to attain reasonable security.

With the aid of charts Weldon explained in detail the various programs used by Esso, their method of operation, cost to the company, and employe participation.

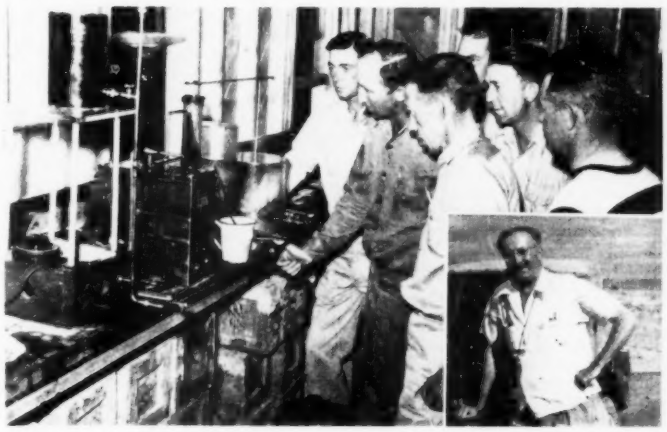
Another speaker was Thurman Sensing, research director of the Southern States Industrial Council, Nashville, who described the security program of the British Labor Government as observed during a recent trip to England. Chairman of the meeting was C. L. Stinnett of Lion Oil Co., El Dorado, Ark. About 25 representatives of member refineries attended.

C.A.A. Offers to Supply Iowa Co-op If Formed

Consumers Cooperative Association has offered to supply lube oil, greases, and refined oils to Iowa oil jobbers if they want to organize a co-op, Howard W. Cowden, president of C.A.A., announced last week.

The cooperative association would supply the Iowa group with up to 1,000,000 gal. of refined fuels a month. The offer was made to J. A. Dennis, secretary of Iowa Independent Oil Jobbers Association. The move followed the recent meeting of jobbers in Des Moines.

ATTENDING EMULSION-TREATING SCHOOL



Shown here is a portion of the 72-member class which recently completed a 2-week school in the treating of oil-field emulsions. The course was conducted in Rangely, Colo., and was sponsored by the Vocational Training Committee of the Rangely Engineering Committee, headed by J. J. Zorichak (inset), in cooperation with the Rangely public schools and the Colorado State Board for Vocational Education. The men are observing the operation of a miniature oil-treating unit built by the Bureau of Industrial and Business Training of the University of Texas Extension Division. In this equipment actual oil-field emulsions are treated under controlled conditions

Interior Waits on Congress for

by Bertram F. Linz

New Policy in Leasing Acquired Lands

NO oil and gas leases are now being issued on the Government's acquired lands in cases where companies are competing for the mineral rights.

However, Interior Department officials say leases will be issued again when it becomes more definitely known whether Congress will act on pending legislation providing for competitive bidding for such leases.

The acquired lands are those obtained by the Government through purchase, condemnation, or other means for military facilities, wild-life preserves, additions to national forests, or other such specific purposes. They are in a separate category from the public lands, and their administration is covered by separate statutes.

The Interior Department suspended leasing after a series of hearings which resulted in the tabling of the legislation by the House public lands committee. The suspension was seen by some oil men as a "flouting" of the committee.

Interior officials, however, declared that far from flouting the committee, they were taking steps to assure that nothing would be changed in case the committee should change its mind in the near future and revive the legislation.

Won't Last Long

Congressmen, they explained, might not like it if the department hastily began issuing leases merely on the ground that the legislation had been tabled, which might prove to be only temporary. They said they expect the suspension to be of only a few months duration and that the committee will advise them of the final disposition of legislation in the near future.

The present situation had its origin in the Department of Agriculture, which originally administered much of the acquired lands.

The leasing of the acquired lands for oil and gas development was turned over to the Interior Department by Agriculture 2 years ago, but Agriculture still retains ownership of the lands and receives the revenues from Interior leases, 25 per cent of the oil revenue going to the states and counties in which the lands are located. That 25 per cent "cut" is the basis of all the arguments that have been going on.

While Agriculture held administration of the lands it made two or three oil leases on a competitive-bid basis, but when Interior took over it applied the provisions of the Mineral Leasing Act and made several leases in Mississippi and Louisiana on a noncompetitive basis. It might be stated, incidentally, that while the Government holds acquired lands in every state, all of the controversy has centered around the oil-bearing lands in Mississippi and Louisiana.

Too Slow, Some Say

In the past 2 years Interior has consummated only a few leases, and there has been some complaint over the slowness with which applications are handled. Officials, however, explain that this has been due to a lack of staff and the lack also of a centralized record of all the lands acquired by the Government, estimated at around 33,000,000 acres but actually not definitely known. Because there is no central record, it was pointed out, it is necessary for Interior to go to the holding department to ascertain the status of any lands involved in an application. This requires additional time which, eventually, will cost the Government much more than the $150,000 for which it is believed all of the records could be microfilmed and brought together in a central file.

Except for applicants seeking leases, no particular attention was paid to the acquired lands until early this year when members of Congress from the two southern states began to receive complaints from the county authorities of the small cut they were receiving as compared with the sums secured when the Department of Agriculture granted leases for bonuses.

The counties were particularly critical of the "cheap" leases granted by Interior as compared with the high rentals and bonuses which they said private owners of potential oil lands in the same areas were receiving. They demanded that something be done to bolster their revenues.

As a result, several bills were introduced in Congress providing for competitive bidding for leases on the acquired lands, but the authors of other bills finally got together behind Rep. A. Leonard Allen of Louisiana, who wrote a measure based on recommendations of the Agriculture and Interior departments, calling for bidding on leases in which a "competitive" interest had to be shown.

A "competitive interest" would be deemed to be shown, under current Interior policy, if more than one application embracing the same lands is filed within 15 days of each other or if, without time limit, the Geological Survey determines that a competitive interest exists in an area.

The legislation went to the House public lands committee and was the subject of a series of hearings by a subcommittee at which it was developed that the whole idea of the legislation was to get more money for the Louisiana and Mississippi counties. Allen, in fact, suggested that the bill might be limited to those two states, and the situation in other areas be left undisturbed.

On the other hand, oil men appearing before the committee strongly opposed the idea of making them pay heavy bonuses for a chance to find out whether Government lands contained oil, and asserted the legislation would make it practically impossible for a small independent operator to get leases on the acquired lands.

More important, they expressed the fear that if the policy of requiring bonuses for leases of unproved lands is applied in this instance, it will prove the entering wedge for a drive to extend the same idea to the public lands, on which competitive bidding is now required only for leases on the known geologic structure of a producing field.

Fears Well Founded

That these fears had some bases was later demonstrated by the disclosure that the Interior Department had been considering a change in the regulations to provide that if land applied for became known to be on a known structure after the application was filed but before the lease was issued, the application would be rejected and the land offered for competitive bidding.

This proposal would upset the policy which consistently has been followed since the Mineral Leasing Act was adopted in 1920 that the status of the lands should be determined as of the date of application for lease; if not on a known geologic structure of a producing field, the lease would go to the first qualified applicant.

After considerable discussion within the department, mostly apparently from the administrative standpoint, the matter was dropped, at least temporarily, but officials were quick to give assurance that before any such regulation was adopted it would be subject to open discussion and probably public hearings.

Discussion of this matter at a recent meeting of the Interstate Oil Compact Commission and elsewhere brought out the industry's position

that the filing of an application should "freeze" the determination of the status of the lands covered and their condition, whether or not on a known structure, as of the date of filing should control. Any other procedure would place the Government in the same class as speculators in leases, permitting to hold up action on an application until the land can be classified as on a known geologic structure and then leasing it to the highest bidder.

No Structures Outlined

In the case of the acquired lands the geologic-structure theory cannot be used since no structures have yet been outlined in Mississippi or Louisiana, the two states in which there has been the greatest activity on this type of lands. The few leases that have been issued by Interior have gone to the first bidder, and industry representatives have emphasized that any change in policy would make it impossible for the independent operator, who has been responsible for some 70 per cent of all discoveries, to compete for Government lands against the well-financed major oil companies.

Following the hearings, the committee voted to table the measure, but because of the possibility it might reverse itself later, the department discontinued the issuance of leases for acquired lands in Louisiana and Mississippi and for lands in other states where a competitive interest was indicated. The complete suspension of leasing in two states was designed to give the committee time to consider whether it wished to do anything about the situation and protect the department against criticism in the event the issue is later revived.

Currently, the department is merely marking time waiting for Congress to indicate whether it is going to take any action. It has not under taken to draft any regulations as to the procedure to be followed should competitive bidding be required, and it is continuing with the processing of pending applications, reportedly numbering around 10,000.

Bureaus Disagree

The several bureaus in the department which are interested in oil are not in complete agreement over the desirability of changing the present procedure, and it is quite possible that the National Petroleum Council will be requested by Secretary J. A. Krug to study the matter and make suggestions.

During the hearings on the legislation, Agriculture and Interior officials stressed the increased revenue the Government would secure if competitive bidding were required for oil leases. The present annual income from oil operations on Government lands, public and acquired, is around $30,000,000 a year, which it was said is approximately 10 times the amount allocated to Interior for administration of leasing operations. No estimate was made, however, of the increased revenue which would be derived from bonuses on the acquired lands.

Interior officials denied reports circulating in some areas of the industry that if competitive bidding were adopted lease-holders who are developing their properties would find their leases worthless. A lease is a formal agreement which can be broken only for causes specified in the document, it was explained at the department, and lessees would be in no danger of losing any of their rights.

All pending applications for leases in competitive areas, however, would be thrown out and the lands opened to competitive bidding, it was conceded.

Spot Shortages Still Threaten, DeRosay Says

Spot shortages of heating oils still may develop unless jobbers, distributors, and homeowners join refiners in storing oil for peak winter demands, K. E. DeRosay, of Sun Oil Co., declared last week.

If storage is inadequate at all levels, he warned, transportation facilities will be overtaxed in periods of peak demand and products cannot be delivered "where and as" needed, he said.

Louisiana's Oil Activity Now at Year's High Point

BATON ROUGE.—Oil activity was greater during August than any month of this year, according to figures released this week by S. L. Digby, state conservation commissioner.

Activity in August included completion of 211 wells, of which 180 were producers, and the issuance of 259 permits for new wells, including 31 wildcats.

Of the producers brought in, 143 were completed as oil wells and 37 as gas or gas-condensate wells. Forty of the new oil wells were in Caddo-Pine Island, Tullos-Urania, and other recognized stripper fields.

At the end of the month, Digby reported, there were approximately 316 rigs running in the various fields and wildcat locations in the state, including 50 in the Houma district, 49 near Lafayette, 27 near Lake Charles, 31 near New Orleans, 36 in the Monroe area, and 123 in the Shreveport area.

Many Industry Phases to Be Covered at I.N.G.A.A. Meet

Many phases of the natural-gas industry's activities will be covered in papers to be presented at the annual meeting of Independent Natural Gas Association of America in Dallas, October 31.

The 1-day meeting, to be held at the Baker Hotel, will feature discussions on topics of interest to royalty owners, producers, transporters, and distributors.

A. B. Harper, Fort Smith, I.N.G.A.A. president, and president of Arkansas-Oklahoma Natural Gas Co., will make his annual report, and following will be discussions concerning winter-supply problems, with S. B. Irelan, Oklahoma City, president of Cities Service Gas Co., presenting a paper on "Winter Supply Problems of Transporters." G. A. Staples, Corpus Christi of Chicago Corp., will deliver a paper on "Winter Supply Problems of Producers and Gatherers."

Mineral Board to Meet

BATON ROUGE. — The Louisiana state mineral board will meet here on November 23 to consider mineral lease bids on state lands. Monday, October 3, will be the deadline for accepting applications for advertisement and leasing at this meeting. Thursday, November 10, will be the last day docket material will be accepted.

Next Week

PIPE-LINE ISSUE—Our annual special—Bigger and better than ever—Eighty pages of carefully chosen material covering every phase of this vital and fast-moving branch of the industry—Twenty-five articles on economics, design theory, construction practices, operation, maintenance—Crude, products, natural gas—Domestic and international—Twenty prominent pipe liners discuss their specialties in articles written exclusively for this issue—Tables detailing construction projects under way and planned, revealing most active period in industry's history.

DON'T MISS—Six-page picture spread "On the Line" illustrating every major step in pipe lining—Preview of things to come in construction technology and economy by our Pipe-Line Editor—EXTRA—Four-color wall map 28 by 40 in. showing the natural-gas pipe lines of the United States as of today.

SECTION ONE
LAST TANK OF CRUDE OIL IN THE WORLD TO BE PRODUCED NEXT WEEK
REVIEWS
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PERSONALS

MacMillan Takes New Post With Continental

W C. MacMILLAN, vice president and administrative assistant to L. F. McCollum, president of Continental Oil Co., Ponca City, Okla., has been elected executive vice president of the firm.

MacMillan is a veteran of more than 20 years of service with the organization. A native of Williamstown, Mass., he attended Brown University and joined Continental in the geological department.

Successive appointments included the position of manager of Continental's land department and vice president in charge of production. On January 1 this year he was elected vice president and administrative assistant to the president.

Serge B. Jurenev, secretary of Continental Oil Co., Ponca City, Okla., was elected vice president in charge of coordinating and planning at the company's board of directors meeting in New York City. The board also elected **Rawleigh Warren, Jr.,** who will succeed Jurenev as secretary. Jurenev is a graduate of Dartmouth College, was with J. P. Morgan & Co., Inc., for 16 years, and joined Continental in February 1942. Warner, formerly assistant to the treasurer of Continental, is a graduate of Princeton University. He joined Continental in July 1948.

Robert L. Fleming has joined Tide Water Associated Oil Co. as an associate engineer at the company's Drumright, Okla., refinery. He recently graduated in petroleum engineering from University of Tulsa. **Hubert A. Moore,** geologist, has been transferred from Tallahassee to the geological office in Houston, and **William C. Ziegenhain,** chemical-engineering graduate from Oklahoma University, has joined the company as associate engineer at Drumright.

Dr. J. M. Hansell has been appointed geologist for the Canadian division, Sun Oil Co.'s producing department, with headquarters in Calgary, Alta. Dr. Hansell joined Sun 15 years ago and formerly served as regional geologist for the area east of the Mississippi River, headquartered in Dallas. **W. H. Devine** has been appointed geologist in the Jameson area of West Texas, and the following transfers were announced: **Sam Coggin,** geologist, from Jameson area to Dallas; **W. L. Erwin** from Tallahassee to Jackson, Miss.; **James A. Alcorn,** geologist, from work in the Dallas office to surface work; and **Dr. Louise Jordan** from Tallahassee to Amarillo to do paleontological work.

Robert L. Rowan of the firm Rowan & Buchanan, Houston, has been elected chairman of the South Texas section, American Society of Mechanical Engineers. **J. P. Warren,** Dow Chemical Co., Freeport, was elected vice chairman, and **J. H. Howard,** consulting engineer, Houston, was named secretary-treasurer. Area vice chairman elected include: Austin area, **Venton L. Doughtie,** professor of mechanical engineering, Texas University; Baytown area, **E. A. Bynum, Jr.,** Humble Oil & Refining Co.; Beaumont-Orange-Port Arthur area, **R. L. Nicols,** Magnolia Petroleum Co., Beaumont; College Station area, **Carl W. Files,** professor of mechanical engineering, Texas A. & M.; Corpus Christi area, **G. R. Avery,** Southern Alkali Corp., Corpus Christi; Freeport area, **B. F. Norman, Jr.,** Freeport Sulphur Co.; and San Antonio area, **R. H. Knipping,** engineer, San Antonio.

Charles R. Criss, district engineer in Michigan for Sohio Petroleum Co., has been transferred to the company's eastern division, headquartered at Evansville, Ind., as engineer.

Paul A. Best has been named assistant to the president of California Oil Co., wholly owned subsidiary of Standard Oil Co. of California. He will be responsible for supply and distribution of petroleum products, and will handle special assignments for President **E. W. Endter.**

G. Clifford Johnson has been named superintendent in charge of mechanical departments at Sun Oil Co.'s Marcus Hook, Pa., refinery. He previously served as assistant superintendent in charge of maintenance and construction. Other changes include: **Clay Mullins,** transferred from Sun field to Sour Lake, Tex., as district production foreman; and **Edward J. Field, Jr.,** named administrative engineer of the company's manufacturing-engineering department at Philadelphia.

E. R. Wood has been reemployed by the Texas Railroad Commission as engineer in charge of the Mount Pleasant office. He formerly worked for the commission 3 years, and just prior to his reemployment was with Skelly Oil Co. at the Carthage field. **George W. Taylor** has also joined the commission as a geologist in the Corpus Christi office.

Ira H. Cram, vice president in charge of exploration for Continental Oil Co., Ponca City, will be transferred to new headquarters in Houston by the end of the year, when the headquarters-exploration group of the company is relocated in that city. Also involved in the move will be: **S. K. Clark,** coordinator; **J. A. Culbertson,** chief geologist; **L. F. Athy,** manager of the geophysical department; **H. R. Prescott,** assistant manager of the geophysical department; and **W. E. Haggard,** manager of the land department.

H. W. Brown has been named assistant chief geophysicist for Carter Oil Co., Tulsa. He formerly served as supervisor of foreign geophysical operations. **R. F. Weichert,** formerly on loan to Imperial Oil, Ltd., from Standard Oil Co. (N. J.), will assume the position of supervisor of foreign geophysical operations. The company also announced that **R. C. Clark,** who recently served as supervisor of geophysical operations in Carter's Northwest division, will become assistant supervisor of foreign operations, and **C. N. Hurry,** associated with geophysical work in both the United States and Canada, will become supervisor of domestic geophysical operations. Brown, a graduate of Louisiana Polytechnic Institute, joined the company's

H. W. BROWN

PERSONALS

R. F. WEICHERT

R. C. CLARK

geophysical department in 1935; Weichert, graduate of Rice Institute, Houston, joined Carter in 1935, transferring to the parent company in 1940; Clark, graduate of University of Nebraska, has been with Carter since 1935; and Hurry, graduate of Colorado School of Mines, joined the company in 1935.

Paul W. Sturm has joined the staff of Bradford petroleum-production laboratory, Pennsylvania Grade Crude Oil Association, as a technician. He formerly was operator of a compressor station for G. L. Cabot Gas Co., Charleston, W. Va.

F. M. Brackbill, district engineer at Perry, Okla., and **G. D. Lambert,** division geophysicist at Tulsa for Shell Oil Co., have been transferred in the same capacity to Oklahoma City.

W. A. McMillan has been made assistant manager of the technical and research division of The Texas Co. and director of technical services. He formerly was assistant director of research at the Beacon laboratories.

Lewis J. Bicking, Jr., formerly petroleum engineer at Tulsa for Ashland Oil & Refining Co., has been transferred to Oklahoma City, where he will serve in the same capacity.

J. A. LaFortune, executive vice president of Warren Petroleum Corp., Tulsa, has been appointed Knight Commander of the Order of St. Gregory by **Pope Pious XII.** LaFortune has been active in the lay activities of his church for many years. He is a trustee of Notre Dame University. **J. L. Donovan,** Stanolind Pipe Line Co., Tulsa, has been appointed a Knight of the Order of St. Gregory.

J. A. LaFORTUNE

Robert J. Gutru, formerly geologist for Cities Service Oil Co., has been placed in charge of the newly opened geological offices of Champlin Refining Co. in Wichita.

Eugene Holman, president of Standard Oil Co. (N. J.), has been named chairman of the New York Convention Committee of the thirty-sixth National Foreign Trade Convention to be held October 31-November 2 at the Waldorf-Astoria Hotel in New York. In accepting the chairmanship, Holman said the forthcoming convention "is especially important because it will give the leaders of American business an opportunity to consider practical means of opening the way to a strong upsurge of world business."

John O. Galloway, Calgary, Alta., Canada, has been retained by Canadian Bank of Commerce as petroleum consultant. He formerly was executive vice president of California Standard Co., but resigned in August to establish petroleum-consulting offices in Calgary.

James G. McKee has joined the industrial-engineering staff of Manufacturers Light & Heat Co., Pittsburgh. He received his industrial-engineering degree from Geneva College, Beaver Falls, Pa.

New officers of American Association of Oilwell Drilling Contractors are pictured at the recent annual meeting held in Dallas. First row, left to right: Ralph W. Marshall, Drilling & Exploration Co., Inc., Los Angeles, vice president for California; Joseph S. Morris, Allen & Morris, San Antonio, retiring president; Warren S. Churchill, Arrow Drilling Co., Dallas, new president; Joseph V. Dunbar, Dunbar Drilling Co., Salem, Ill., vice president-at-large; Louis A. Beecherl, McDaniel & Beecherl Drilling Co., Dallas, reelected treasurer. Second row: J. F. Postelle, Odessa, Tex., vice president for West Texas and New Mexico; Zach K. Brinkerhoff, Jr., Brinkerhoff Drilling Co., Casper, Wyo., vice president for Rocky Mountains; H. L. Rowley, Big Chief Drilling Co., Mississippi, vice president for Cretaceous and Tertiary basins; J. Doyle Settle, A.A.O.D.C., Dallas, secretary; Marion S. Church, Dallas, general counsel. Third row: Brad Mills, A.A.O.D.C., Dallas, executive vice president; R. W. Wire, Lofland Brothers Co., Tulsa, vice president for Central Mid-Continent; Ira Van Tuyl, V-T Drilling Co., Evansville, Ind., vice president for Illinois, Michigan, Indiana, and Kentucky; Roger J. Wolfe, Grey Wolf Drilling Co., Houston, vice president for Gulf Coast. Not present at the meeting were J. A. Fox, Washington, Pa., vice president for cable tools, and J. J. Harrigan, Standard Well Service Co., Oklahoma City, vice president for well servicing

O. H. Blexrud, Lindsay, Okla., geologist for Magnolia Petroleum Co., has been assigned to geological duties in the company's Oklahoma City office.

James F. Donham, petroleum engineer for Bay Petroleum Co., Tulsa, has been transferred to Oklahoma City in the same capacity.

J. L. Krieg has joined Transcontinental Gas Pipe Line Corp. as a progress engineer at Newman, Ga. He recently graduated from Texas Technological College.

Rex Richardson, formerly chief clerk at the Wichita compressor office, Cities Service Gas Co., has been named superintendent of the Tallant, Okla., compressor station, succeeding **F. A. McAdams,** who is now head of the enlarged compressor station at Saginaw, Mo. Other changes include: **George W. Crane,** formerly in charge at Saginaw station, named superintendent at Knobnoster, Mo.; **Carol McCoy,** named superintendent at North Hugoton compressor station, Ulysses, Kans.; and **Harold Moore,** formerly superintendent at North Hugoton station, named superintendent at the new Tonganoxie, Kans., compressor station.

Joseph E. Dinger, who has been assistant foreman in the Falfurrias, Tex., district for Magnolia Petroleum Co., has been named production foreman in the Lake Charles, La., district. **J. F. Mayfield,** petroleum engineer, has been transferred from the Rusk district in East Texas to the Rodessa producing district; **Philip H. Jennings** will be transferred October 1 from Houston to the company's general offices in Dallas, as staff geologist, and **W. R. Canada** will be named district geologist in charge of the Houston-Lake Charles district.

Oscar E. Bransky, assistant chief of the ECA petroleum branch, is serving as acting chief pending appointment of a successor to **Walter J. Levy,** who resigned last month. Bransky, who graduated from Johns Hopkins University in 1910, was for many years with Standard Oil Co. (Ind.), serving as plant manager of the Whiting, Ind., refinery and, from 1933 to his retirement in 1948, assistant general manager for all refinery operations. He joined the ECA last year.

Jack L. Dunn, formerly division production superintendent for Warren Oil Corp. in the North Texas area, has been promoted to district manager of the Panhandle area, with headquarters at Kellerville, Tex. He is a graduate petroleum engineer from the University of Oklahoma. **Jack L. Coulson,** formerly assistant division production superintendent, will succeed Dunn as division production superintendent in the North Texas area. He is a graduate mechanical engineer from Oklahoma A. and M. College and prior to his affiliation with Warren was a petroleum engineer for Amerada Petroleum Corp. for 12 years.

Felix Mendoza, president of the National Petroleum Council of Colombia, and **Daniel Vargas Sierra,** chief refining engineer of the council, are expected to arrive in New York in late September for a stay of several weeks. They will confer with officials of Foster Wheeler Corp. regarding the survey Foster Wheeler is making of over-all petroleum requirements of the country.

Paul Lambright, vice president and a director of International Petroleum Co., Ltd., Toronto, has been named manager of all International operations in Peru. He will replace **Harold A. Grimes,** former manager, now in the United States on furlough and who will be in the producing coordination department of Standard Oil Co. (N. J.) on a temporary assignment.

Max L. Krueger, Rocky Mountain division manager for Union Oil Co., will resign on November 15 to accept a position as vice president in charge of exploration for Conorada Petroleum Corp., with headquarters in New York City. **E. R. Atwell,** formerly assistant chief geologist of the Pacific Coast division for Union Oil at Los Angeles, has been appointed division manager for the company's Rocky Mountain operations.

J. P. Schmalz, district petroleum engineer for Magnolia Petroleum Co. at Rodessa, La., has been chosen recipient of the company's producing division fellowship for the coming year, and has been granted a 1-year leave of absence for further studies in the field of petroleum engineering.

T. J. Skrabanek has been appointed superintendent of compressor stations for Lone Star Gas Co., succeeding **B. L. Rogers,** retired.

SHIFTS—

Mercer Martin, foreman, American Oil Service Co., Long Beach, Calif., to Kermit, Tex.; **Lloyd A. Lewis,** geologist, Shell Oil Co., Paso Robles to North Sacramento, Calif.; **F. L. Addicks,** superintendent, Makin Drilling Co., Roswell to Hobbs, N. M.

DEATHS

William T. Dinkins, 60, vice president and a director of Richfield Oil Corp., died September 22 in Los Angeles. A native of Chicago, Dinkins joined Richfield in 1937 after more than 20 years with Sinclair Oil Corp.

Jesse A. Barbre, 66, Dallas, pioneer oil man who figured in early-day development in the Mid-Continent area, died September 24.

Wirt Adams Paddock, 79, Houston, independent oil operator, died September 24.

Paul Wilborn, 39, gasoline-plant operator for Phillips Petroleum Co. at Eliasville, Tex., died in Breckenridge, Tex., September 21.

R. C. Brittain, 59, for more than 25 years with Gulf Oil Corp.'s producing department, died in Breckenridge, Tex., September 21.

John A. Toohey, 70, Lubbock, Tex., retired dispatcher for Sinclair Oil & Gas Co., died September 19.

George Aston, 42, and **Elbert R. Harris,** refinery employes at Magnolia Petroleum Co.'s refinery No. 1, Fort Worth, died from injuries received in a fire at the refinery recently.

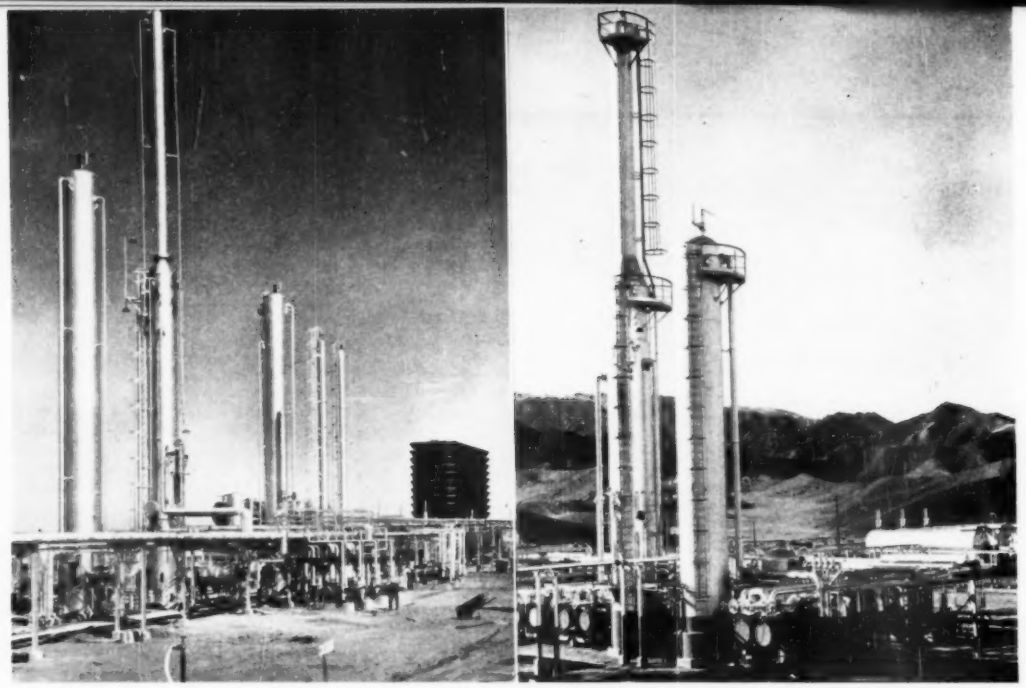
L. B. Sessums, 60, Tulsa, refinery-construction worker for Phillips Oil Co., died in Kansas City, Kans., September 21.

Oswen Mowers, veteran Texas oil man, died in Dallas September 19.

Melvin Riley Robinson, 32, Wink, Tex., Gulf Pipe Line Co. lineman, died at Kermit, Tex., September 19.

Frank M. Wilson, veteran foreman with 33 years of service for Magnolia Pipe Line Co., died in Drumright, Okla., recently.

Todd K. Glenn, 51, vice president, secretary, and general manager of Penn Glenn Oil Works, Oil City, Pa., died September 19 in Pittsburgh.



Left: This view of a plant recently built in New Mexico shows the rich-oil stabilizer, second vessel from left. Right: The rich-oil stabilizer (left) and a primary absorber installed for field processing operations in California

Rich-Oil Stabilization

by S. Goldblatt* and H. M. Nelly, Jr.†

THE recent interest in the use of rich or fat oil stabilization in gasoline plants[1,2,3] is well justified, as this operation has been found in many instances to be the most economical solution in the design of new plants and in the revamping of existing plants for higher propane recoveries.

Rich-oil stabilization refers to the removal of methane and ethane from rich oil while retaining the propane and heavier hydrocarbons. Fig. 1 shows two plants, one with and one without rich-oil stabilization. A comparison of these plants shows some of the advantages of rich oil stabilization, such as total condensation of the stripping-still overhead product thus eliminating all flashing, recycling, and reabsorption operations.

In any gasoline-absorption plant, a major design problem is the separation of methane and ethane from the propane and heavier hydrocarbons contained in the rich oil from the primary absorption operation. The higher the propane recovery, the more difficult this problem becomes, as more methane and ethane will be absorbed with the additional propane.

*Process engineer, and †vice president, Refinery Maintenance Co., Compton, Calif.

Although there have been a number of systems described in the past few years for rich oil stabilization, two have been more generally accepted. The first of these,[1] shown in Fig. 2, uses absorption for retention of the propane and heavier hydrocarbons and reboiling for the elimination of methane and ethane. The second, shown in Fig. 3, likewise uses absorption for retention of the propane and heavier materials but differs from the first in that a preheater is used to heat the rich oil before it enters the stripping section and stripping is accomplished with the use of recycled vapors or wet gas in place of reboiling.

Third System in Operation

Recently, a third system, shown in Figs. 4 and 5, having certain advantages over previous systems, was put into operation. This third stabilization method, developed by Refinery Maintenance Co., and used commercially in 1947, utilizes absorption for the retention of the propane and heavier hydrocarbons, a preheater for heating the rich oil prior to its entrance into the stripping section, and reboiling for elimination of methane and ethane.

An examination of the two flow charts of Fig. 1 shows that in the plant without rich-oil stabilization, vapors are produced in a rich-oil flashing operation and in the stripping-still reflux drum which must be recycled and reprocessed in a reabsorber in order to prevent excessive loss of propane, butane, and gasoline that were recovered in the initial absorption. Methane and ethane are only partially separated from the heavier hydrocarbons in the single flash at the still reflux drum; so a deethanizer column in the fractionating section of the plant is necessary to produce commercially pure propane.

In the plant with rich-oil stabilization, the methane and ethane are removed immediately after the initial absorption and are not further processed. Therefore, the entire flashing, recycling, reabsorption, and deethanizing systems are eliminated and an appreciable portion of the remainder of the plant equipment is reduced in size.

There are many possible variations in the design of plants not using rich-

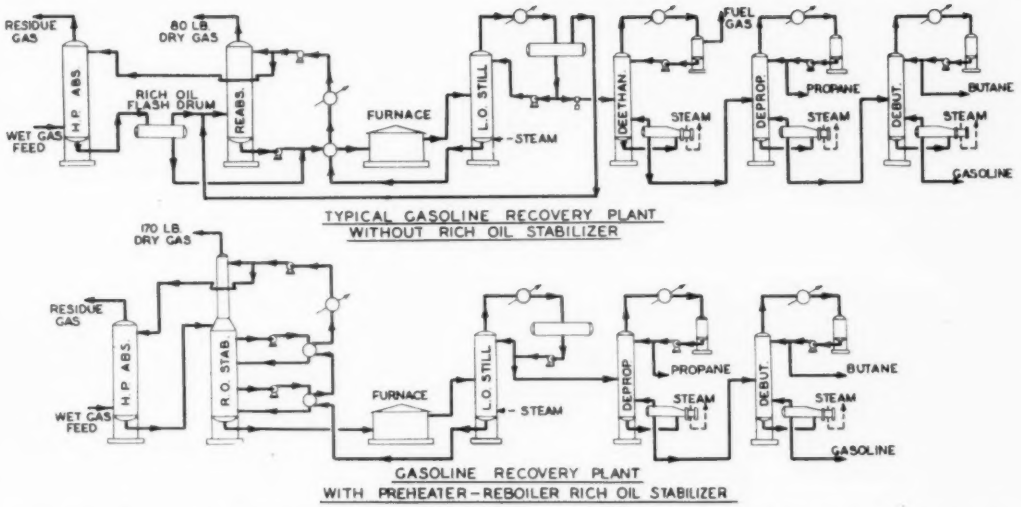


Fig. 1 - These diagrams, one incorporating a rich-oil stabilizer and the other following conventional design, show the major difference in the two schemes

oil stabilization which may incorporate recompressors, double still systems, flash tanks, and reabsorption in various combinations. In a recent comparison, the estimated cost of a plant using the third method of rich-oil stabilization was $180,000 or 15 per cent less than the most economical design that could be arrived at without use of rich-oil stabilization. Further, the utility requirements were appreciably less, which represents lower operating costs and quicker investment payout.

A description of the flow and equipment arrangement in the preheater-reboiler stabilizer shown in Fig. 4 follows. An understanding of this system and reference to Figs. 2 and 3 will explain the fundamental differences and manner of operation of the three systems.

The bubble trays in the absorption section above the feed tray function like a conventional absorber. Lean oil is admitted on the top tray and rich oil leaves from the bottom tray.

Below the feed point are bubble trays on which vapors from the stripping section contact with the rich oil from the feed and absorption section, preventing stripping heat from passing into the absorption section. Actual plant operations have shown that heat exchange on these trays is very complete, and that the operation of the absorption section is independent of the heat input and operating temperatures in the stripping section.

The partially preheated rich oil leaving this heat-exchange section flows to a drawoff pan from which it is pumped through a preheating exchanger back to the tower above the top stripping tray. The vapors generated in the preheater are released in the tower and the finally preheated liquid flows down over the stripping trays countercurrent to the stripping vapors generated in the reboiler.

Heat to the reboiler and preheater is supplied in most cases with hot lean oil from the bottom of the still. It may, however, be supplied with steam, a direct-fired heater, or a combination of these three means, depending upon the heat balance in the plant and the temperature level in the rich oil stabilizer.

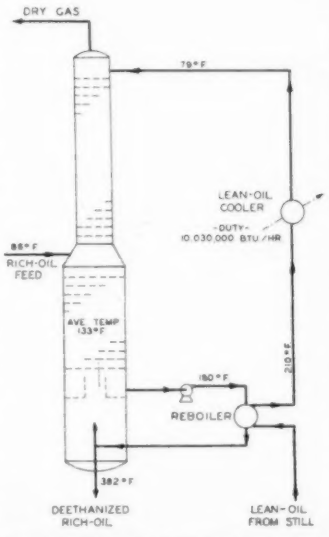


Fig. 2—Rich-oil stabilizer employing single reboiler system

Comparison of the three systems, Figs. 2, 3, and 4, reveals certain important differences. Fig. 4 shows actual operating temperatures while the temperatures shown on Fig. 2 have been calculated using the same wet gas analysis and recoveries that correspond to the data of Fig. 4. A study of these temperatures will show two very important advantages that the preheater-reboiler system has over the single-reboiler system.

First, the lean oil to the cooler is at 158° F. in the one system as opposed to a temperature of 210° F. in the other. The reason for this difference is the fact that the rich oil in the first case entered the preheater at 128°, and in the second case entered the reboiler at 180° F. In a plant circulating 360 g.p.m. of lean oil, this temperature difference of 52° F. represents an increase in duty on the cooling system of 4,100,000 B.t.u. per hour. Additional equipment would not only be necessary to remove this extra amount of heat, but would also have to be added, together with the necessary utilities, to the heating system of the single-reboiler unit to supply the 4,100,000 B.t.u. per hour.

Second, in the case of the preheater-reboiler arrangement, the average stripping temperature is 220° F., with a maximum temperature of 243° F. The corresponding average temperature in the single-reboiler arrangement is 133° F. with a maximum of 180° F. Because of the higher mean temperature in the first case, stripping is more complete and can be accomplished with fewer trays and less reboiler vapor.

These two differences, the lower lean-oil temperature to the cooler, and the higher mean temperature of strip-

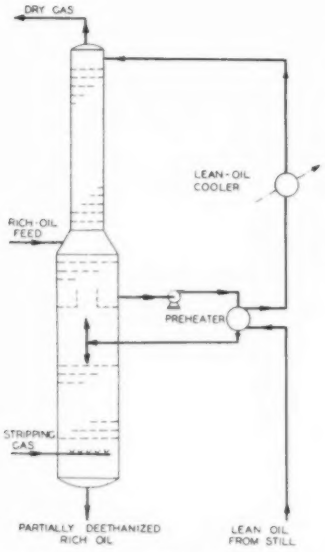


Fig. 3—Rich-oil stabilizer, single preheater system

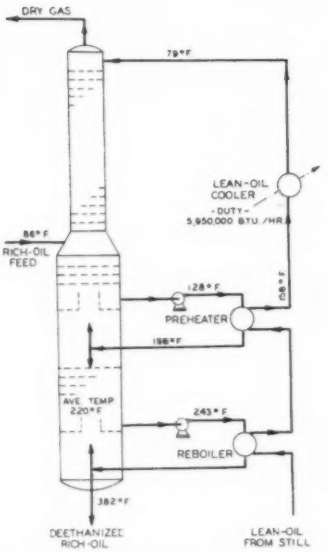


Fig. 4—Preheater and reboiler system, rich oil stabilizer (Patent pending to Refinery Maintenance Co., Inc.)

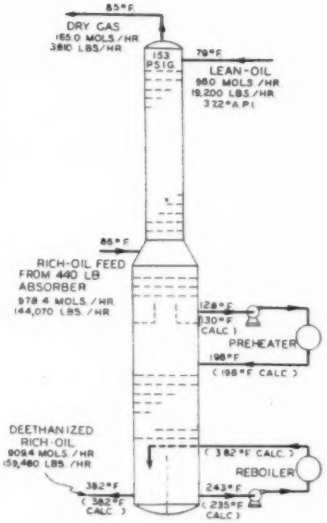


Fig. 5—Operating conditions, rich-oil stabilizer (Patent pending to Refinery Maintenance Co., Inc.)

ping, give the preheater-reboiler system a definite economic and operating advantage over the single reboiler arrangement.

The system shown in Fig. 3, which incorporates only preheating, has very definite limitations as compared to the other two stabilizing systems. First, the degree of deethanization is entirely dependent upon the vapor used for stripping. If complete deethanization is required, it is necessary to recycle a stripping vapor essentially free of ethane. The vapor in this event would generally be propane from the top of the depropanizer column, which would increase the lean-oil requirements in the top absorption section considerably to maintain the over-all propane recovery. Second, if complete heat exchange between the rich oil and the hot lean oil is taken in the preheater, the amount of vapors generated is so great that a large heat-exchanger section is required to prevent warming up of the bottom of the absorber section.

An application in which the single-preheat system may be used advantageously is where only partial demethanization and deethanization are required. Such an application is sometimes found when high-pressure absorbers are located on gas-transmission lines. In these cases, it is important that all of the gas except that used for fuel be returned to the transmission line at full pressure. Here a preheat of the rich oil leaving the absorber section of approximately 100° F., with the injection of wet gas at the bottom of the stripping section, will result in the elimination at full absorber pressure of about 80 per cent of the methane and ethane from the rich oil.

Single-stage reboiling has not been considered applicable for processing lean gases or for high propane recoveries.[1] On the other hand, the preheater-reboiler system has been found economical to install and operate over a wide range of feed-gas compositions and propane recoveries. Our experience shows that it is not possible to set an upper economic limit on the propane recovery of preheater-reboiler stabilizers, nor when a wet gas would be considered too lean for this method of deethanization, as there are too many variables affecting each design.

Table 1 gives the feed-gas analysis, over-all propane recovery, and compositions of the wet gas and propane product, of two plants now in operation using preheater-reboiler rich oil stabilizers.

TABLE 1

Wet gas composition, volume per cent:	Plant A	Plant B
Methane	84.08	93.69
Ethane	7.28	3.63
Propane	5.40	1.54
i-Butane	0.62	0.27
n-Butane	1.57	0.42
i-Pentane plus	1.05	0.45
Total	100.00	100.00
Liquid content, i-butane plus, G.M.	1.114	0.406
Over-all propane recovery, per cent	40.7	80.2
Propane recovery in rich-oil stab., per cent	87.5	92.0
Propane purity, volume per cent:		
Ethane	1.50	1.13
Propane	97.06	97.83
i-Butane	1.11	0.85
n-Butane	0.33	0.19
Total	100.00	100.00

DRY GAS, 21.9 MW

Comp.—	Calc. Mol. %	Act. Mol. %
C_1	64.2	64.2
C_2	29.8	29.7
C_3	6.0	6.0
i-C_4	0.0	0.1
n-C_4	0.0	0.0
Total	100.0	100.0

RICH-OIL FEED FROM 440-PSI ABSORBER, 48.1° A.P.I.

Comp.—	Calc. Mol. %	Act. Mol. %
C_1		5.7
C_2		4.8
C_3		9.0
i-C_4		1.9
n-C_4		4.6
C_5^+		1.8
Lean oil		72.2
Total		100.0

DEETHANIZED RICH OIL, 41.3° A.P.I.

Comp.—	Tankage Mol. %	Analysis Mol. %
C_1	0.0	0.0
C_2	0.1	0.0
C_3	8.3	8.4
iC$_4$	1.4	1.4
C_4	4.2	4.7
C_5^+	2.8	2.0
Lean oil	83.2	83.5
Total	100.0	100.0

Tankage Values Used

Although the propane purity given in Table 1 shows ethane contents between 1 and 1.5 per cent, contents as low as 0.08 per cent have been obtained.

The design of preheater-reboiler rich-oil stabilizers is involved and to some extent empirical.

Fig. 5 shows the essential stream compositions and quantities about an operating preheater-reboiler rich oil stabilizer. The first step in the design

(Continued on page 82)

Control of the Production of RESIDUAL FUEL OIL

by George Armistead, Jr.*

RESIDUAL fuel oil has historically been the only major refinery product valued at less than crude price. Oversupply of the material has been frequent, and on many past occasions it has been subject to weakened markets requiring disposal at distress prices. In the postwar years, the higher price of crude and the corresponding increases of value of the distillate products from it have brought about increased price differentials between the latter and the residual-fuel-oil prices which prevail in oversupply periods. This, along with the steadily increasing demand for distillate fuels, has been a strong incentive for decrease in residual-fuel-oil production in favor of distillates.

It is readily possible under modern processing methods to convert a substantial portion of the present 23-27 per cent over-all refinery yield of residual fuel oil from crude into distillate products, to the extent that economics justify, and at the same time obtain some improvements in motor-fuel quality. If carried to the ultimate extent, the nation-wide production of residual fuel oil can be reduced to below 12 per cent crude, or to less than half its present yield over the country as a whole, and to even lower percentages in limited areas with corresponding increase in distillate-fuel production. The basis of such operations is the substitution of catalytic for thermal cracking and the increased use of catalytic cracking feed-preparation steps such as delayed coking or propane deasphalting.

Source of Tar Fractions

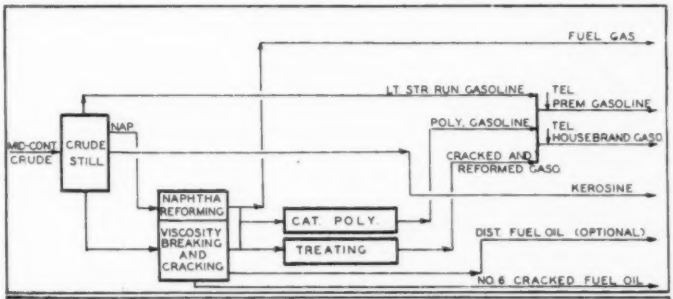
The origin of residual fuel oil or heavy gas oils which must be disposed of as such, resides both in the tarry fractions originally present in the crude and the polymerized products resulting from cracking to obtain desired yields of gasoline. For example, the production of residual fuel from a conventional thermal cracking operation to maximum gasoline yield on Mid-Continent crude is derived from the following sources:

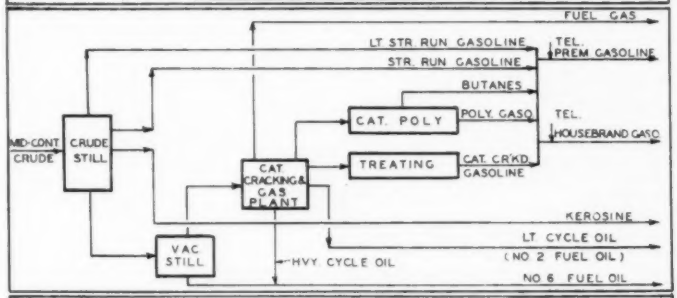
Product—	Per cent of total residual fuel
Straightrun tar	35
Thermal cracking tar	60
Naphtha reforming tar	5
Total	100

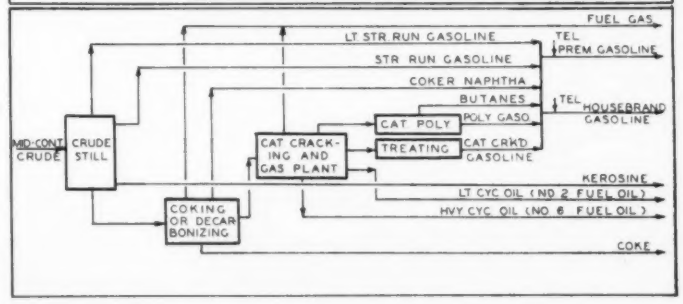
Previously Used Expedients

Thermal cracking operations have always had a limited amount of flexibility as to yields in connection with the withdrawal of cracked gas oil streams for disposal as distillate fuels. This operation has slightly reduced cracked tar production and has frequently permitted increased throughput capacity. Since the drawoff streams for distillate fuels have usually been as virgin as possible in character they were also potentially the highest-gasoline-yield and lowest-tar-yield portions of the gas oil (about 60 per cent gasoline yield and less than 30 per cent cracked tar) and the withdrawal caused substantial gasoline-yield loss. The gas-oil withdrawal operation has therefore been primarily an exchange of gasoline yield for distillate-fuel yield with comparatively little effect on total cracked residuum.

In times of weakened fuel-oil markets in past years, refiners operating thermal cracking sometimes undertook to reduce their residual-fuel-oil







*Chemical engineer, Washington, D. C.

Fig. 1—(Top) Operation 1. Conventional thermal cracking and naphtha-reforming operation on Mid-Continent crude

Fig. 2—(Center) Operation 2. Vacuum flashing and catalytic cracking operation on Mid-Continent crude

Fig. 3—(Bottom) Operation 3. Delayed-coking and catalytic cracking operation on Mid-Continent crude

production by the coking of one or more of the above products. These operations were sometimes directed more at the disposition of a product which was in pood demand than at its conversion to more valuable products. The coking processes were generally of three types, as follows:

1. Coking of the virgin reduced crude which destroyed the virgin tar, followed by conventional thermal cracking of the coker gas oil to completion.

2. The single-stage coking of virgin reduced crude to complete yields of gasoline, fuel gas, and coke. This operation actually included the coking of cracked gas-oil tars as well as the virgin tars.

3. The separate coking of tar from gas-oil cracking to complete yields of gasoline, fuel gas, and coke.

Operation 1 was the most economically attractive of these methods since it effected the minimum destruction of liquid hydrocarbons and lowered the over-all refinery viscosity level. It did not, however, affect the main source of tar, namely, that from the cracking of the gas oil to completion and the amount of residual-fuel-oil reduction from the process was definitely limited. Operations 2 and 3 both involved the coking of tar from gas-oil cracking, which is highly refractory, and gives high yields of coke and gas but relatively low yields of gasoline.[1] The coking of a cracked tar below 10 A.P.I. giving 40 per cent or lower yield of gasoline and 50 lb. or more coke per barrel was almost invariably uneconomic and justified only in extreme marketing situations. Moreever, coking of highly cracked materials resulted in large loss of recoverable liquid.

Catalytic Cracking

As a result of the advent of commercial catalytic cracking about 10 years ago, and its large expansion in use during and after the war, the United States now has approximately 1,500,000 bbl. per day total catalytic cracking feed capacity, with a gasoline producing capacity of approximately 550,000 bbl. per day. The increase in catalytic cracking capacity has not only improved the octane-number quality of motor fuel obtainable from crude, but has substantially altered the product distribution.

The product distribution change results from the production by catalytic cracking of more cycle oil of a distillate-fuel character in lieu of the heavy thermal cracked tar. It is a characteristic of catalytic cracking that the heavier gas-oil fractions which are poor thermal cracking feed stocks give good gasoline and distillate-fuel yields. There is, therefore, strong economic incentive for the charging to catalytic cracking of the heaviest fractions which can be obtained from the original crude residues. The adaptability of heavy stocks for catalytic cracking has favored the production of increased amounts of straightrun distillates such as diesel oils and kerosine, since distillate-fuel production as a whole has been augmented by the catalytic cracked gas oils. The residues themselves have so far been impractical to charge directly to the catalytic operation for several reasons, such as catalyst poisoning and the severe limitations which their high coke content imposes on the operations.

The majority of satisfactory catalytic cracking feed stock can be segregated satisfactorily from virgin residues by vacuum distillation or by viscosity breaking, over-all results of which are comparable. It is highly desirable in the catalytic cracking operation that the cycle stock produced contain the maximum amount within the boiling-range limits of No. 2 fuel oil. Normally, a portion of the cycle stock will be required to blend off the vacuum tar to viscosity specifications, and the amount of this blending stock increases with the heaviness of the original crude.

It has been found that relatively low-conversion recycling operations are conducive to the production of increased amounts of low-boiling cycle oils. That is, it is possible to produce a greater yield of material in the No. 2 fuel oil boiling range from a recycling operation than by single-pass catalytic cracking at the same conversion. Under typical conditions employing vacuum flashing and catalytic cracking on a Mid-Continent crude, the composition of the residual fuel oil will be approximately as follows:

Product—	Per cent of residual fuel oil
Vacuum tar	55
Heavy catalytic cycle oil	45
Total	100

Decarbonizing Processes

As a consequence of the incentive to catalytically crack the maximum gas-oil content of virgin residues, two types of processes have obtained commercial acceptance for this purpose.[2] They serve to eliminate the heaviest coke-forming fractions from virgin residuum as well as salts and other materials harmful to catalyst, and are:

1. Coking operations, chiefly of the delayed coking type, which have previously been used also for thermal cracking feed preparation.

2. Propane deasphalting, wherein the heaviest tarry fraction is selectively extracted and the remaining oil made available for catalytic cracking feed.

These processes either destroy or reduce the virgin tar which is the residual product of vacuum distillation and they both increase correspondingly the obtainable yield of gasoline and of distillate fuels through increasing the amount of catalytic cracking feed. The propane decarbonizing process actually makes as a final product, a heavy asphaltic tar which must be blended off with the catalytic cycle stock to viscosity specifications. The amount of catalytic cracking feed from the propane decarbonizing or coking processes, under comparable conditions are about equal, as the asphalt elimination in the former is of the same order as the coke, gasoline, and gas production from the latter.

In general, detailed studies have shown the delayed coking and the propane decarbonizing processes to be competitive both in investment and operating return, although significant differences between them can be shown to result from local conditions, such as the markets for coke and fuel oil, the availability of low-cost natural gas fuel, and the like.[2] New improvements in continuous-coking processing have recently been an-

(Continued on page 73)

TABLE 1—SUMMARY OF YIELDS (38° A.P.I. MID-CONTINENT CRUDE)

Operation—	I Crude dist. therm. crkg. therm. ref.	II Crude dist. vac. fl. cat. crkg.	III Crude dist. coking red. cr. cat. crkg.
Cracking charge, per cent of crude:			
To thermal cracking	56	0	0
To catalytic cracking	0	48	50
To thermal reforming	18	0	0
Yields—volume per cent crude:			
Premium gasoline	15.9	14.6	15.0
Housebrand gasoline	47.7	43.6	45.0
Kerosine	10.0	10.0	10.0
No. 2 fuel oil	0.0	17.7	17.0
No. 6 fuel oil (150 S.S.F. at 122° F.)	20.3	12.9	7.0
Coke (weight per cent)	0.0	0.0	2.4
Fuel gas, F.O.E.	7.4	3.8	7.0
Octane numbers:			
Premium gasoline:			
F-1 (Res.) + 2.8 cc.	86	86	86
F-2 (Mot.) + 2.8 cc.	79.5	83	82
Housebrand gasoline:			
F-1 (Res.) + 1.8 cc.	81.2	81.0	80.5
F-2 (Mot.) + 1.8 cc.	75.7	74.5	73.2

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Specific Heats *of* Natural Gases

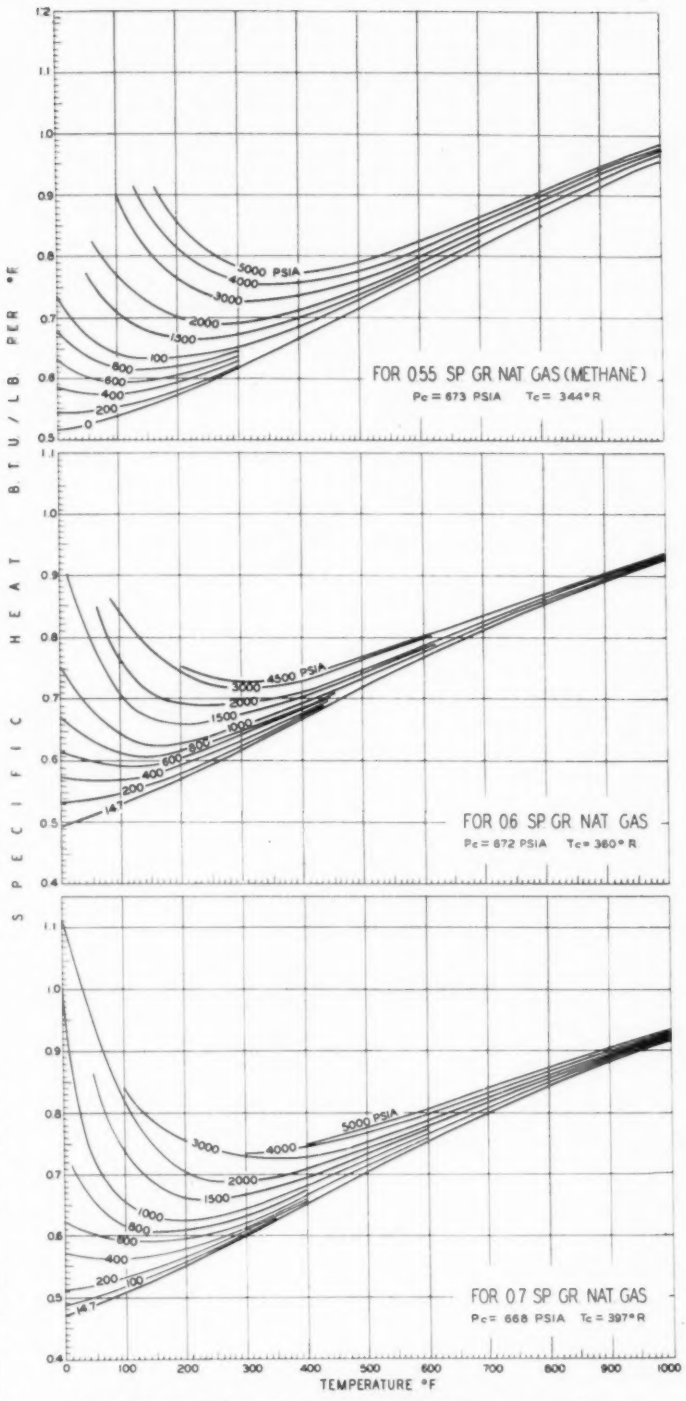
by Paul Buthod*

THE processing of hydrocarbon gases in gasoline plants, cycling plants, and refineries is being conducted at continually higher pressures. Since processing usually requires heating or cooling of the gas, it is essential that reliable specific-heat data be available. The charts presented here are designed to give specific heats of natural gases under pressure in a convenient form.

The specific heat of individual hydrocarbons at atmospheric pressure have been studied in great detail.[1] The data for hydrocarbon mixtures such as natural gas have also been fairly well established at atmospheric pressure.[2] There has been very little direct measurement of specific heats under pressure for either individual hydrocarbons or for mixtures. From a study of thermodynamics, it is possible to derive rigorous mathematical equations relating specific heats at high pressure to volumetric data.[3,4] In cases where volumetric data have been determined accurately over a wide range of pressures and temperatures, these equations yield accurate specific heats. This is true in the case of many of the individual hydrocarbons. However, in the case of mixtures, we must rely on the law of corresponding states for volumetric data which is not absolutely accurate over all conditions of pressure and temperature. The thermodynamic equations are of such a nature that they magnify these errors with the result that the final specific heats obtained have a low degree of accuracy, especially in the neighborhood of the critical temperature.

Even considering the probable inaccuracy in the derived specific heats, they are all that are available and must be used until better data are obtained. As usually plotted, the specific heat at high pressure minus the specific heat at atmospheric pressure, or ΔC_p, is plotted against reduced pressure, "P_r," for various reduced

*Associate professor of refinery engineering, University of Tulsa.



Figs. 1-3—Specific heat plots for 0.55, 0.60, and 0.70 sp. gr., natural gas

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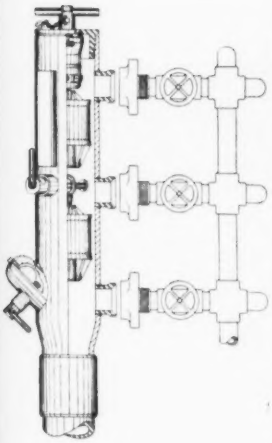

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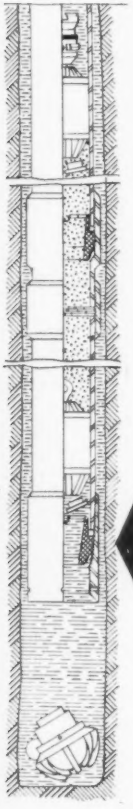

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D-4	4100	10000	D-15	15000	114000
D-5	5200	16000	D-21	20700	160000
D-7	6500	25000	D-24	24150	228000
D-9	8900	40000	D-29	29000	320000
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temperatures, "T_r." The ΔC_p thus obtained must be added to an atmospheric heat from some other source.

In constructing the accompanying charts, the average critical pressure and critical temperature were chosen for a natural gas of a given specific gravity. Then for that gravity gas, the ΔC_p correction was determined for all conditions of pressure and temperature. When combined with atmospheric specific heats, these gave the specific heat at any pressure and temperature. A plot of these is shown in Figs. 1 through 5 for 0.55 (methane), 0.6, 0.7, 0.8, and 0.9 specific gravity gases.

It should be emphasized at this point that these charts represent no improvement in accuracy over the references cited. However, it is believed that a considerable saving in time can be accomplished by using these charts and in most cases without sacrificing any accuracy.

The following examples will illustrate the use of these charts:

Example 1.—A natural gas has a specific gravity of 0.75. What is its specific heat at 120° F. and 1,000 psia.?

Solution.—Since there is no chart for a 0.75 specific-gravity gas, it must be interpolated from the charts for 0.7 and 0.8.

0.7 sp. gr. gas, sp. ht. is 0.640
0.8 sp. gr. gas, sp. ht. is 0.670

Interpolating between these two values gives a specific heat of 0.655 for a 0.75 specific gravity gas at 120° F. and 1,000 psia.

Example 2.—A gas compressor used in pressure maintenance takes a 0.6 specific gravity gas at 700 psia. and after two stages of compression delivers it to the field at 4,500 psia. The gas from the first stage leaves the compressor at 1,750 psia. and 210° F. Before entering the second stage it must be cooled to 90° F. in an intercooler. If water enters the intercooler at 80° F. and leaves at 100° F., how many gallons per minute of cooling water must be used if the station handles 10,000,000 standard cubic feet of gas per day?

Solution.—

$$\text{Gas handled} = \frac{10{,}000{,}000 \times 0.6 \times 29}{24 \times 379}$$

$$= 19{,}100 \text{ lb. per hour}$$

Mean gas temperature in intercooler

$$= \frac{210 + 90}{2} = 150° \text{ F.}$$

Specific heat from Fig. 2 is 0.687.

Intercooler duty = 19,100 × 0.687 × (210 — 90) = 1,580,000 B.t.u. per hour.

Water required = 1,580,000 / (100 — 80) = 79,000 lb. per hour.

Water required = 79,000 / 60 × 8.33 = 158 g.p.m.

Example 3.—A gas-dehydration plant handles 50,000,000 standard cubic feet per day of a 0.7 specific gravity gas at 800 psia. In the regeneration process, 20 per cent of the flow is continuously heated from 80° to 350° F. to dry the adsorbent. How much heat must be supplied in B.t.u. per hour?

Solution.—Gas handled by heater = 50,000,000 × 20 per cent = 10,000,000 s.c.f.d.

$$\text{Gas handled} = \frac{10{,}000{,}000 \times 0.7 \times 29}{24 \times 379}$$

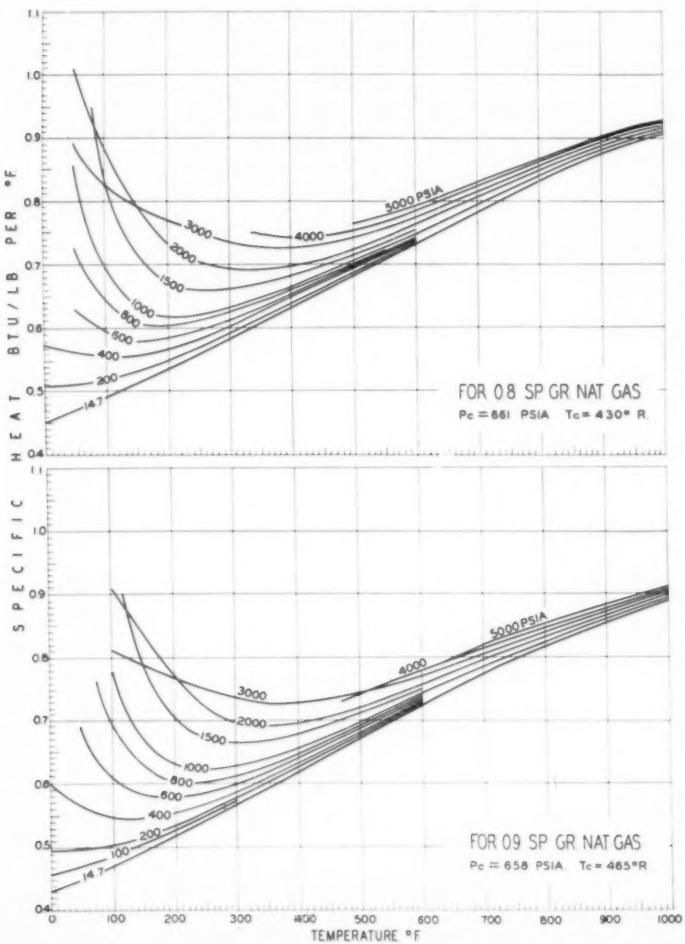
$$= 22{,}300 \text{ lb. per hour}$$

Mean gas temperature in heater

$$= \frac{350 + 80}{2} = 215° \text{ F.}$$

Specific heat from Fig. 3 is .612.

Heater duty = 22,300 × 0.612 × (350 — 80) = 3,680,000 B.t.u. per hour.



Figs. 4 and 5—Specific heat plots for 0.8 and 0.9 sp. gr. natural gas

Acknowledgments

These charts among others for pure hydrocarbons were prepared by W. E. Bell, T. E. Fitzgerald, M. L. Knotts, W. B. Nelson, R. J. Riggs, G. S. Stenman, P. P. Swift, and F. L. White, graduate students in petroleum engineering at University of Tulsa, 1949.

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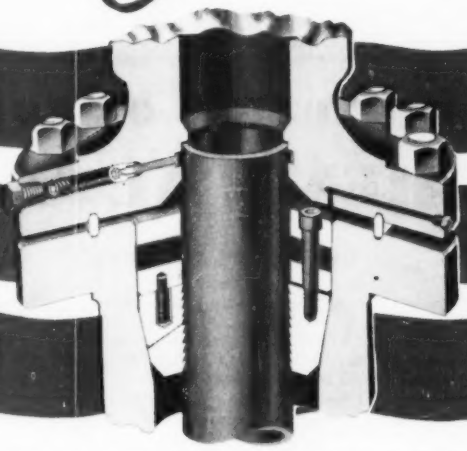
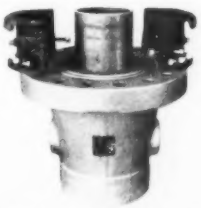


Sectional view of hanger with Type "FX" tubing head installed above.

Hanger assembly in closed, or latched, position.

Hanger assembly in unlatched position.



Hanger installed in casing head. Note split setting guide which has served its purpose and may now be discarded

As illustrated herewith, the Cameron Type "A" Automatic Hanger assembly consists of 6 slip segments which are attached to the two halves of a hinged packing assembly, with a setting guide on top. Each slip segment carries a wedge which, in the free position, projects slightly beyond the tapered surface of the slips. The bottom of these wedges bear on inclined planes in the slip segments and the top of the wedges bear on the lower packing retainer plate. Upon reaching its seat in the casing head, the outer taper on the wedges contact the casing head taper and the slip teeth engage the pipe. As pipe load is slacked off onto the hanger the wedges are forced inward and upward on the inclined planes, forcing the lower packing retainer plate upward to compress the packing.

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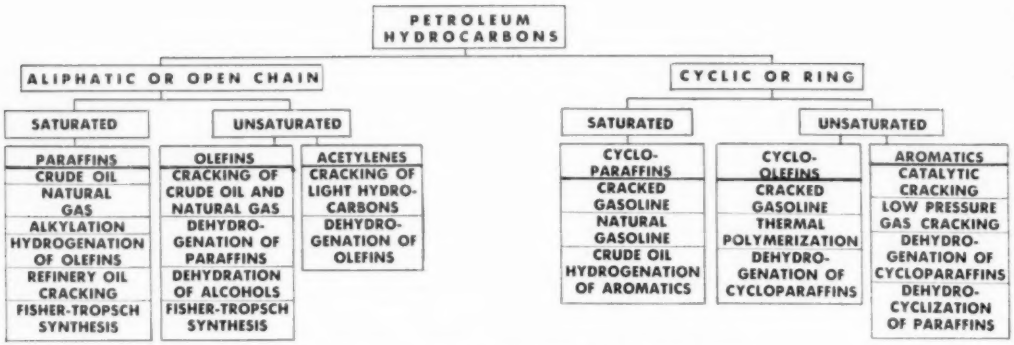


Fig. 1—Petroleum-hydrocarbon classification and important sources

EVOLUTION OF THE PETROCHEMICAL INDUSTRY

by Charles W. Perry*

IN the American chemical world at present, one of the most significant movements is the increasing use of petroleum raw materials for manufacturing organic and inorganic chemicals. This movement received its first major impetus from the thermal cracking of crude-oil fractions, starting about 1920, and has been abetted continually by the constant quest for larger volumes of better hydrocarbon motor fuels. Hydrocarbons of all types are finding increasing usage in an enlarging array of petrochemical products.

In defining petroleum as the raw material for the petrochemical industry, it is desirable to use it in its broadest sense, to include all liquid and gaseous hydrocarbons taken from the earth. This consequently includes crude oil, natural gasoline, liquefied petroleum gases, and natural gas. For completeness, the naturally occurring higher - molecular - weight hydrocarbons such as asphalt, waxes, gilsonite, etc., should be included in this category. These are mainly used either directly, with some refining, or compounded as such in physical mixtures. These chemical raw materials have been available since the start of the petroleum industry in this country.

The simplest petroleum chemical raw material available to the industry is natural gas, which has as its main component the simplest paraffin, methane. Heavier hydrocarbons and impurities such as hydrogen sulfide, nitrogen, and carbon dioxide may be present in varying amounts.

Natural gas represents, after natural-gasoline extraction of hydrocarbons heavier than C_2, if present, a source primarily of impure methane. This must very often be increased in purity by various treating methods in order to present a suitable raw material for chemical processes.

Liquefied petroleum gases constitute the C_3 and C_4 petroleum raw materials, fractions obtainable either from natural-gasoline operations or as byproducts of crude-oil refining. If the liquefied petroleum gas is obtained from natural-gasoline operations, it will contain only saturated paraffin hydrocarbons including mainly propane, normal butane, and isobutane. If it is obtained from refining operations, it will usually contain varying amounts of the corresponding C_3 and C_4 olefins, although frequently up-to-date refineries polymerize these out to form more gasoline.

Advantages of L.P. Gases

As chemical raw materials, the liquefied petroleum gases represent the highest-vapor-pressure petroleum components transportable by railroad tank cars, tank trucks, or ships and barges in liquid form. Natural gas must either be used at the source or transported by pipe line. Thus, liquefied petroleum gases have definite advantages to the petrochemical manufacturers who require relatively small volumes in any part of the United States. The price is in part influenced by geographical location, but in the southwest may be purchased currently for 5 cents per gallon or less at natural-gasoline plants, which means 1.7 cents per pound or less for a relatively pure chemical raw material.

Paralleling the cases of all petroleum products since 1940, liquefied petroleum gases have undergone remarkable increases in production and availability. For long-term usage in the United States the natural-gas hydrocarbons, including ethane, propane, and butane, represent the best prospects.

Consideration of the light petroleum fractions as chemical raw materials cannot be complete without a discussion of ethane. This hydrocarbon is volatile enough to exclude transportation in commercial quantities except by pipe line. Nevertheless, because of its possible high conversion efficiency to ethylene (up to 75 per cent by weight) it is attracting increasing attention. Modern natural-gasoline plants handling many million cubic feet per day of natural gas have fractionated streams frequently with attractive concentrations of ethane.

As an example of the potentialities here, a case has been considered for recovering 800,000 lb. per day of ethane in an ethane-rich stream from 300 million cubic feet of South Texas natural gas, and cracking the ethane to 500,000 lb. of ethylene. With an 85 per cent efficiency, this could be converted to 38 million gallons of anhydrous ethyl alcohol per year.

Natural gasoline and liquefied petroleum gases are recovered simultaneously from natural gases containing appreciable quantities of hydrocarbons heavier than propane (wet gas) by physical methods, which include compression and condensation, absorption and adsorption. Because it is recovered from a vapor stream, the composition of butane-free natural gasoline is somewhat simpler than liquid fractions distilled from crude

*Phillips Chemical Co., Bartlesville, Okla.

oil with the same initial and final boiling points. Consequently, several commercially pure hydrocarbon chemicals are obtainable directly by intensive distillation from natural gasoline.

The occurrence and properties of several chemical components of a typical Mid-Continent butane-free natural gasoline are given in Table 1. Superfractionation may be employed to divide such natural gasoline up into preliminary fractions for further subdivision of its chemical products to commercial purity. These hydrocarbon chemicals are either useful directly or may be converted into many other chemicals.

In considering natural gasoline as a raw material to be separated by physical means into commercial-grade chemicals, it should be observed that this is a function best assigned to petroleum companies having large central fractionating facilities. Table 1 indicates that many of the desirable chemical products are present in Mid-Continent natural gasoline to the extent of 5 per cent or less. The primary objective of a petroleum company in fractionating natural gasoline is to separate high-octane "iso" and "naphthene" fractions from low-octane "normal" fractions. The recovery of chemical products from such a program is the most economical one to be expected. The investment in such complex fractionating facilities is large, and they do not, consequently, adapt themselves well to small-scale operation. It is generally not feasible to fractionate straightrun or cracked gasoline with the same terminal boiling points as natural gasoline into commercial-grade chemical products.

TABLE 1—OCCURRENCE AND PROPERTIES OF HYDROCARBONS IN MID-CONTINENT BUTANE-FREE NATURAL GASOLINE

Component	Pct. in Mid-Cont. B.F. nat. gasoline	Normal boiling point (°F.)	Vapor press. at 100° F. (psia.)
Neopentane	0	49.1	36.65
Isopentane	15-30	82.1	20.44
n-Pentane	20-30	96.9	15.57
Cyclopentane	0.5-1.5	120.7	9.91
2,2-Dimethylbutane	0.3-0.6	121.5	9.86
2,3-Dimethylbutane	0.1-0.3	136.4	7.40
2-Methylpentane	6-9	140.5	6.77
3-Methylpentane	3-5	145.7	6.10
n-Hexane	8-10	155.7	4.96
Methylcyclopentane	2-4	161.3	4.50
2,2-Dimethylpentane	0.1-0.3	174.6	3.49
Benzene	0.2-0.5	176.2	3.20
2,4-Dimethylpentane	0.1-0.3	176.9	3.29
Cyclohexane	2-4	177.3	3.26
2,2,3-Trimethylbutane		177.6	3.38
3,3-Dimethylpentane		186.9	2.77
1,1-Dimethylcyclopentane	0.2-0.5	189.5	
2,3-Dimethylpentane	0.2-0.5	193.6	2.35
2-Methylhexane	2-3	194.1	2.27
1,3-Dimethylcyclopentane (Trans)		195.3	
1,2-Dimethylcyclopentane (Trans)		197.4	
3-Methylhexane	3-4	197.5	2.12
3-Ethylpentane		200.2	2.01
n-Heptane	2-3	209.2	1.62
Methylcyclohexane	1-2	213.7	1.61
Heaviers	4-7		

Crude oil as such has few direct applications as chemical raw materials without preliminary fractionation and treatment. Certain narrow-boiling-range fractions have applications as solvents. Examples are the petroleum ethers boiling in the C_5 and C_6 ranges.

Crude oil represents by far the greatest liquid hydrocarbon volume recovered from the earth. The combined volumes of liquefied petroleum gases and natural gasoline produced in this country in 1948 were less than 10 per cent of the crude-oil volume. Consequently, even relatively small fractions of crude oil resulting from refining procedures, such as ethylene, propylene, and butylene often represent important chemical raw material sources.

In considering any petroleum fraction as a chemical raw material, the number of components is always a matter of prime importance. This is based on the rapidly increasing number of isomers possible as the average molecular weight of petroleum fractions increases. In the case of paraffins it will be recalled that there are only two C_4 isomers, five C_6, nine C_7, but 802 possible C_{15} ones. Consequently, the petrochemical industry has centered its attention largely to date on the light fractions, up to compounds having eight carbon atoms. This explains the popularity of the C_2, C_3 and C_4 fractions.

Thus, crude oil can normally be considered as a chemical raw material only after separation into fractions wherein rough classifications according to molecular weights are made.

Separation Methods and Analyses

The evolution of the petrochemical industry has depended heavily on improved separation and identification techniques, most of which have originated since the beginning of World War II.

The refining and natural gasoline industries have traditionally relied most heavily on the unit process of distillation for their separations. This is still true, but during the most recent war several new variations in extractive and azeotropic distillation were developed. The extension of conventional distilling methods to high-pressure and low-temperature regions so that the light hydrocarbons, for instance, ethane and ethylene, could be included has been accomplished.

New separation techniques are now being applied more widely to hydrocarbons, including continuous adsorption, liquid-liquid extraction with selective solvents and column reflux, and crystallization. Large-scale liquid-liquid extraction processes are requiring improved contacting methods. Chemical methods of separation are also improved, particularly in the field of copper salt solutions with or without ammonia or the ethanolamines.

No less important are the improvements made in methods for detecting or identifying the hydrocarbons. These include the development of the mass, ultraviolet and infrared spectrometers, freezing-point calorimetry, and improved precisions stills.

Over-All Hydrocarbon Raw Material Picture

So far the types of naturally occurring hydrocarbons and their availability from developed recovery methods have mainly been discussed. To round out this picture, consideration must be given to the over-all availability of hydrocarbons from processed materials as well as natural sources. A relationship is outlined in Fig. 1, derived from previous data by G. G. Oberfell.[5] Fig. 1 contains all of the key components for the petrochemical industry. These will be discussed in more detail below. It will be noticed that the current as well as the conventional refining and chemical processes are listed.

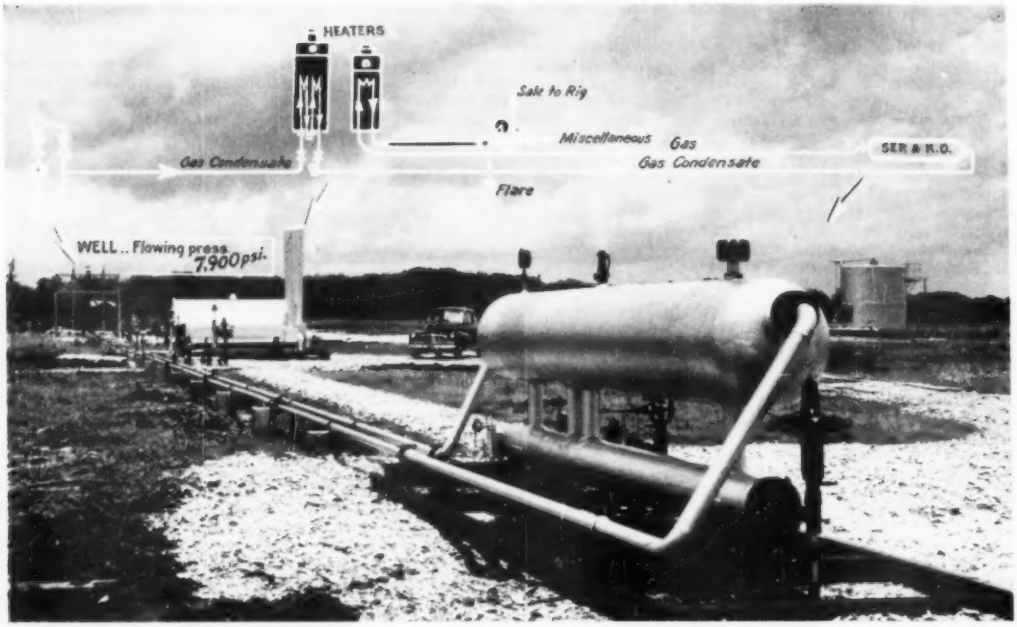
Paraffins have largely been discussed already as being mainly derived from naturally occurring petroleum fractions, or alkylation of isoparaffins with olefins. It is worth while to point out that in some petroleum-refining procedures such as pyrolysis (or cracking), rehydrogenation of olefins take place, as well as direct formation of lighter paraffin molecules. In addition, the Fischer-Tropsch process, using hydrogen and carbon monoxide derivable from methane and steam, synthesizes aliphatic fractions containing both paraffins and olefins, although the latter predominate.

Olefins at present are one of the most important classes of artificially obtained petroleum hydrocarbons. This is because of the large quantities resulting from thermal or catalytic cracking of hydrocarbon oils for gasoline in refineries, and the greater reactivity of olefins as compared to the paraffins. Olefinic fractions are of chemical interest in a molecular-weight range of the simplest, ethylene, to ones having 18 or more carbon atoms.

As pointed out previously, because of the rapidly increasing number of isomers when the number of carbon items is increased, olefinic fractions above C_5 are rarely purified sufficiently as such to be called commercially pure chemicals. Such olefins are commonly synthesized, however, from previously purified hydrocarbons of lower molecular weight. Two C_4 olefins may be combined to give one C_8, for instance. For these same reasons, the usage of the C_2, C_3 and C_4 olefins has far outranked the heavier ones combined.

An alternative source to which the user of ethylene may turn is the pyrolysis of light paraffin hydrocarbons.

(Continued on page 82)



Gulf Oil Corp.'s high-pressure gas-condensate discovery necessitates special equipment for producing

7,900-Psi. Well

Above: This over-all view shows the equipment installed by Gulf Oil Corp. to handle the production from its high-pressure gas-condensate discovery in Brazoria County, Texas Gulf Coast. On an open-flow potential test early this year, the well had a tubing pressure of 7,890 psi. while making 34.3 bbl. of condensate and 4,255.4 M.c.f. per day of gas through a 10/64-in. choke Below: A. C. Heflin and Mike Moore, both of Houston, talk things over by the christmas tree on Gulf's 1 Perry. Heflin pushed tools on the Nicklos rig which drilled the well for Gulf

by Leigh S. McCaslin, Jr.
Houston District Editor

MUCH interest has been evinced in the equipment installed by Gulf Oil Corp. to handle production from its 1 S. S. Perry, a gas-condensate discovery in Brazoria County, Texas, and the highest-pressure flowing well yet discovered on the Gulf Coast.

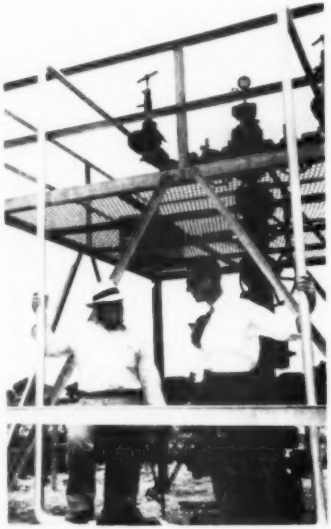
The 1 Perry is located in the Peach Point area 50 miles south of Houston on a 140.4-acre lease, S. F. Austin League, Abstract 27. On its open-flow potential test early this year, the well had a tubing pressure of 7,890 psi., while making 34.3 bbl. of condensate and 4,255.4 M.c.f. per day of gas through a 10/64-in. choke (gas-oil ratio of 123,919 to 1). Calculated open-flow potential was 35,000 M.c.f. daily. The condensate was 44.2° A.P.I. gravity and yellowish-green in color. Now on production, the well has an average tubing flowing pressure of 7,900 psi., while making 64.5 bbl. of condensate and 7,659 M.c.f. per day of gas. (Gas-oil ratio 118,684 to 1).

Prior to the Peach Point discovery by Gulf, the highest-temperature wells in the Gulf Coast were located at Blue Lake field which is also in Brazoria County. McCarthy Oil & Gas Corp. has several high-pressure gas-condensate wells in this field which was discovered in 1945.

Gulf is developing its acreage around the Peach Point discovery and currently has one well being completed and another drilling. Gas from the 1 Perry is being sold to Houston Natural Gas Co. which has a main transmission line within a few hundred feet of the discovery.

Special equipment has been installed and special hookups made by Gulf to handle the high-pressure gas-condensate at Peach Point. Engineering work on the job was handled by Walter Shellshear, assistant superintendent in charge of gas production for Gulf in the Houston district. Superintendent of production for Gulf in Houston is E. P. Hubbard.

A flow diagram for the production



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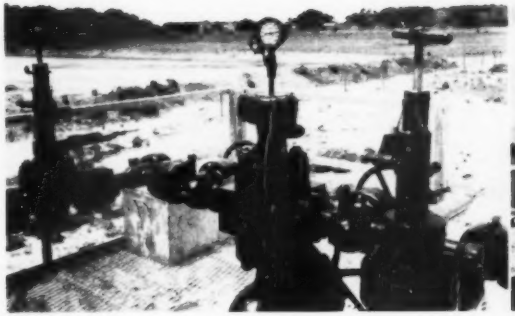
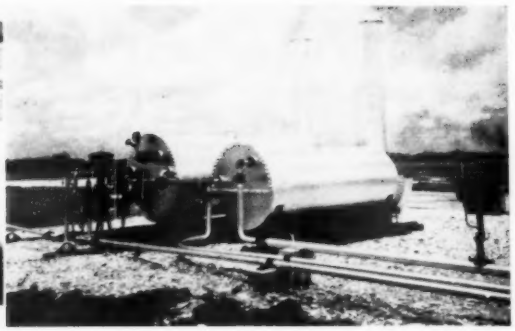
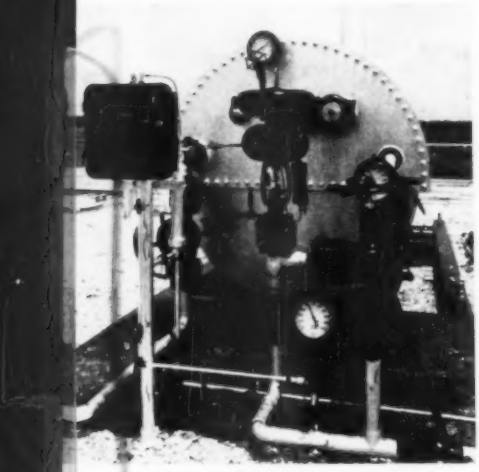






Above, left: Closeup of the christmas tree shows the pressure gage recording 7,900 psi. tubing pressure. Two flow lines are provided with a 15,000-psi. test, positive, chrome choke on each and also safety shutoff valves

Above, right: Production from the Peach Point well passes through these two horizontal heaters. The 5 by 12-ft. high-pressure, indirect heater on the left is a specially built piece of equipment. It was tested to 12,750 psi. and has a coil working pressure of 8,500 psi. The coils are made of 2-in. double extra-heavy seamless steel and were Magnafluxed and stress-relieved by the manufacturer. The heater on the right is a standard 4 by 10-ft., 6,350-psi. working-pressure heater

Left: This end view of the specially built high-pressure heater shows the chokes and regulator used to reduce the pressure of the gas-condensate. After two passes through the heater, with two pressure drops by means of positive chokes, the pressure is further reduced by a regulator. For safety reasons, both a regulator and a choke have been installed on the downstream side so that either may be used for reducing service. The three pressure drops reduce the gas-condensate from its tubing pressure of 7,900 psi. down to 800 psi.

Below, top: After leaving the high-pressure heater, the gas condensate is passed through a combination horizontal separator and water knockout. This is a standard piece of equipment and this particular model has a capacity of 20,000 M.c.f. daily at 1,000 psi. and 3,500 bbl. of liquid per day (water and liquid hydrocarbons)

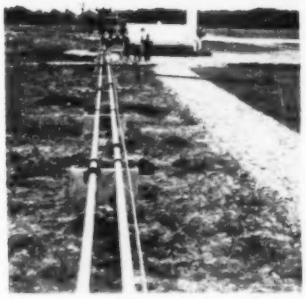
Below, bottom: A dehydration pot for pilot and fuel gas, and a back-pressure relief valve. Meter in the picture measures total gas production of the well

hookup is shown in Fig. 1. Gas-condensate leaves the well at 7,900 psi. through a 15,000-psi. test positive choke. It is next passed through an indirect heater where two pressure drops are made by positive chokes. The gas-condensate leaves the heater at 4,000 psi. and passes through a reducing regulator which cuts the pressure down further to 810 psi.

The production is next passed through a combination horizontal separator and water knockout. The condensate then goes to storage and the gas enters a 6,350-psi. working-pressure heater which is operated at around 810 psi. After leaving the heater, the gas is measured and the major portion enters the gas transmission line. Some of the gas is sold to rigs working in Peach Point field.

A number of precautions have been taken to insure safe operating conditions. Safety shutoff valves which close on a minimum pressure have been installed on the dual flow lines leaving the well head. The dual flow lines are in themselves, of course, a safety measure. On the high-pressure separator, Gulf has installed both a regulator and a choke on the downstream side so that either may be

HIGH PRESSURES demand HIGH QUALITY



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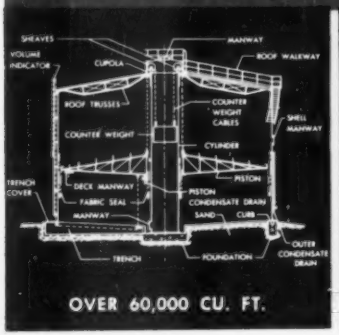
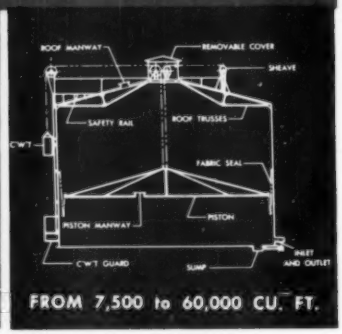


OVER 60,000 CU. FT.



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used for reducing service. A back-pressure safety valve has been installed at the point where the dry gas enters the purchaser's transmission line.

All of the piping was fabricated and tested in Houston shops prior to assembly at the location.

The 5 by 12-ft. high-pressure indirect heater is a specially built piece of equipment which was tested to 12,750 psi. and has a coil working pressure of 8,500 psi. The coils are made of 2-in. double extra-heavy seamless steel and were Magnafluxed and stress relieved by the manufacturer. All turns were reinforced.

Two-inch double-heavy pipe was used on the Peach Point flow line. Unibolt couplings were used to join the pipe. These couplings were welded to the pipe and all joints were Magnafluxed, stress relieved, and then pressure tested to 9,500 psi.

The 24-in. by 15-ft. 1,000-psi. combination horizontal separator and water knockout is a standard piece of equipment. It was introduced to the industry about a year ago. This particular separator and water knockout has a capacity of 20,000 M.c.f. daily at 1,000 psi. and 3,500 bbl. of liquid per day (water and liquid hydrocarbons).

The two heaters and the combination separator and water knockout are all skid mounted. If, for any reason, the well is shut in for any length of time, the equipment can be moved to another well.

Rigging up on the 1 Perry began on April 21 of last year with drilling under way 9 days later. Drilling operations were completed November 15 and the well went on production December 9. Total depth is 12,984 ft. and the top of the cement plug is at 11,36 ft. Producing interval is from 11,278-11,348 ft. with the pipe perforated with 280 holes. Casing record of the well is as follows:

1. 104.40 ft. of 20-in. o.d., 48-lb. spiral weld set April 30.
2. 970.96 ft. of 61-lb. and 2,437.70 ft. of 54.50-lb. 13⅜-in. o.d. seamless set May 8.
3. 2,461.18 ft. of 47-lb. and 4,664.67 ft. of 43.50-lb. 9⅝-in. o.d. Hydril seated at 7,149.00 ft. on June 3.
4. 10,844.43 ft. of 7-in. o.d., 26-lb., N-80 seated at 10,866.00 ft. on July 9.
5. 11,531.34 ft. of 5-in. o.d., 18-lb., N-80 seated at 11,453.14 ft. on November 22.

The tubing string was bottomed at 11,254.53 ft. It consists of 11,198.96 ft. of 2⅞-in. o.d. Nicloy Hydril, 6.54-lb. pipe; a 3.85-ft. perforated nipple, and a 29.08-ft. slick joint.

An Engler distillation test on a sample of condensate from the 1 Perry gave the following results:

Gravity	44.2° A.P.I.
I.b.p.	110° F.
10	193
20	223
30	256
40	292
50	348

60	418
70	479
80	540
90	680
E. P.	728
Recovery, per cent	97.5
Residue, per cent	0.7
Loss, per cent	1.8

The liquid was paraffinic in composition. It was necessary to heat the condenser during the latter part of the distillation to prevent waxing up of the tube.

A Podbielniak analysis of gas from the well is as follows:

	Mol per cent
Carbon dioxide (Orsat method)	0.20
Nitrogen	
Methane	93.66
Ethane	3.74
Propane	1.24
Isobutane	0.36
N-butane	0.29
Isopentane	0.16
N-Pentane	0.13
Hexanes	0.11
Heptanes plus	0.11
Total	100.00

Control of the Production Of Residual Fuel Oil

(Continued from page 58)

nounced,[5] which may make this type of operation more attractive.

Yield Comparison

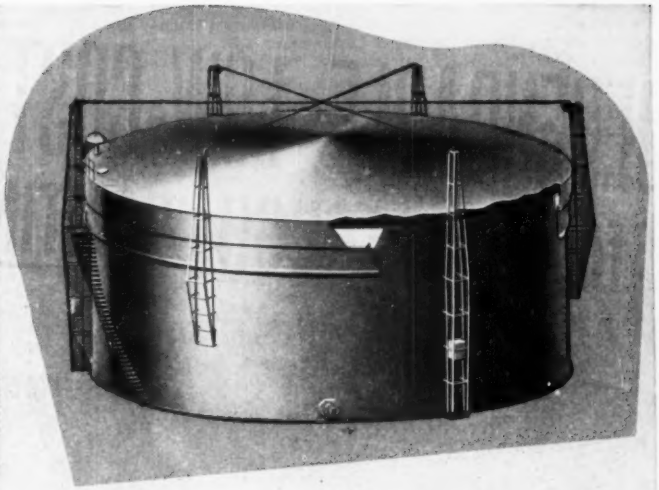
In order to illustrate the magnitude of yield flexibility inherent in the combinations of catalytic cracking with different feed production steps, compared to thermal cracking, plant material balances are presented for the three typical operations illustrated respectively in Figs. 1, 2, and 3. These estimates were developed for Mid-Continent crude based upon the production of 86.0 premium and 80.0 housebrand research octane number gasolines with 2.8 and 1.8 cc. TEL respectively. The three operations were as follows:

Operation 1.—Crude topping to produce straightrun gasolines, kerosine, and reduced crude with no distillate fuels; combination thermal cracking including viscosity breaking, gas-oil cracking, and thermal reforming of 250-400 straightrun naphtha; and catalytic polymerization.

Operation 2.—Crude topping to produce straightrun gasolines, kerosine, and reduced crude with no distillate fuels; vacuum distillation of reduced crude to 7 per cent bottoms on crude; recycle catalytic cracking of all vacuum gas oil at 50 per cent conversion; and catalytic polymerization.

Operation 3.—Crude topping to produce straightrun gasolines, kerosine, and reduced crude with no distillate fuels; delayed coking of topping crude; recycle catalytic cracking of all coker gas oil at 50 per cent conversion; and catalytic polymerization.

Table 1 summarizes the yields from



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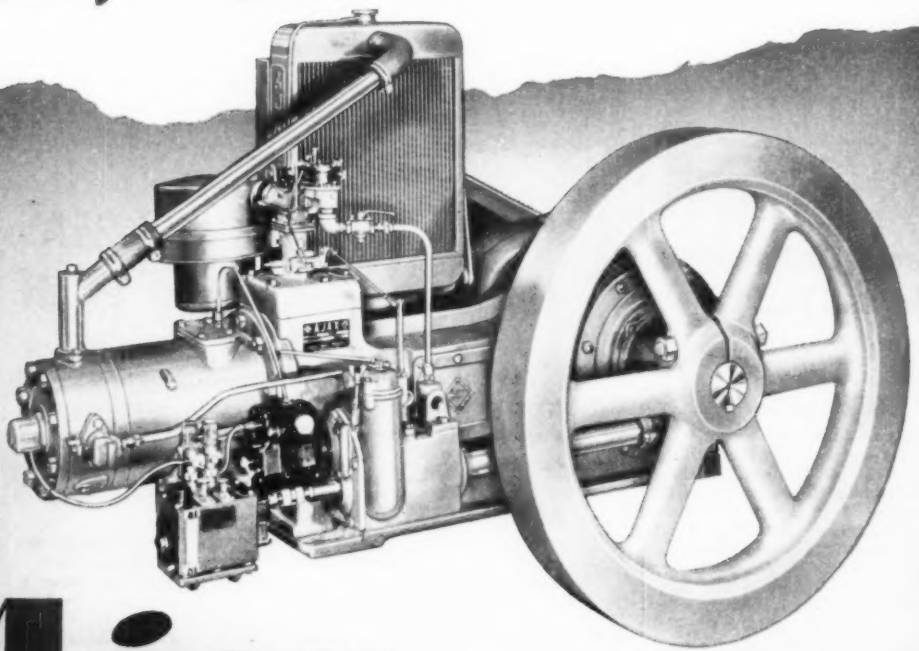

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the three operations under the conditions outlined. It will be noted that No. 6 fuel-oil yield in the thermal cracking Operation 1 is 20.3 per cent to 12.9 per cent in the catalytic cracking Operation 2, whereas in Operation 3 with coking, the yield of No. 6 fuel oil is only 7 per cent. Corresponding to these respective yields of residual fuel oil, it will be observed that the total gasoline yield in Operation 2 is less than in Operation 1, by about 5 per cent. This is due to the 50 per cent conversion level chosen for the catalytic cracking operation. If higher conversion is employed, the gasoline yield can be raised to exceed that of Operation 1, but will be accompanied by a sharp drop in distillate-fuel production.

In Operation 3, however, with increased amount of feed to catalytic cracking the gasoline yield is intermediate Operations 1 and 2. In both Operations 2 and 3, there is a yield of approximately 17 per cent of furnace oil which was not produced in Operation 1. In Operation 3, the gasoline yield can be increased by higher catalytic cracking conversion levels, with sacrifice in distillate-fuel yield.

These illustrative cases for Mid-Continent crude are indicative of the comparative results when applied to heavier crudes. A comparison between the yield of 20 per cent residual fuel and zero No. 2 fuel oil in Operation 1 and the yield of 7 per cent residual fuel with 17 per cent No. 2 fuel oil in Operation 3 defines the maximum range of yield differences possible by three changes in processing. It is noteworthy that a higher liquid recovery is attainable by Operation 2 than in Operation 1, but that despite the coking in Operation 3, the liquid recovery therein is approximately the same as in Operation 1. It is possible with the production of distillate cuts, such as diesel fuel on the crude-topping operation to produce even greater amounts of total distillate fuels, than are shown for all three cases, although gasoline production is correspondingly decreased.

Investment

The investment requirements for Operations 2 and 3 vary, depending upon circumstances such as the status of plant equipment at the time of change and the amount of existing equipment which can be employed for revised processing. A convenient way of expressing the order of such investment is per barrel of crude run in the types of plants shown for Operations 1, 2, and 3.

The cost of conversion from thermal cracking, as covered by Operation 1, to vacuum flashing and catalytic cracking as covered by Operation 2, including utilities and auxiliaries is in the neighborhood of $250 and $350 per daily barrel of crude capacity. The conversion from Operation 1 to Operation 3 on the same basis is in the range of $350 and $400 per daily barrel of crude, while the conversion from Operation 2 to Operation 3 is in the neighborhood of $150 per daily barrel. These investment requirements are substantial, and in any given situation require careful balancing against the obtainable economic advantages of the reduced yield of residual fuel and increased distillate-fuel production. It is obvious that these means would permit the residual-fuel production to be cut by more than 50 per cent, and if adopted extensively can be an important steadying influence in the residual-fuel price field. This is a trend which has been predicted[4] and present events indicate that it is developing strongly.

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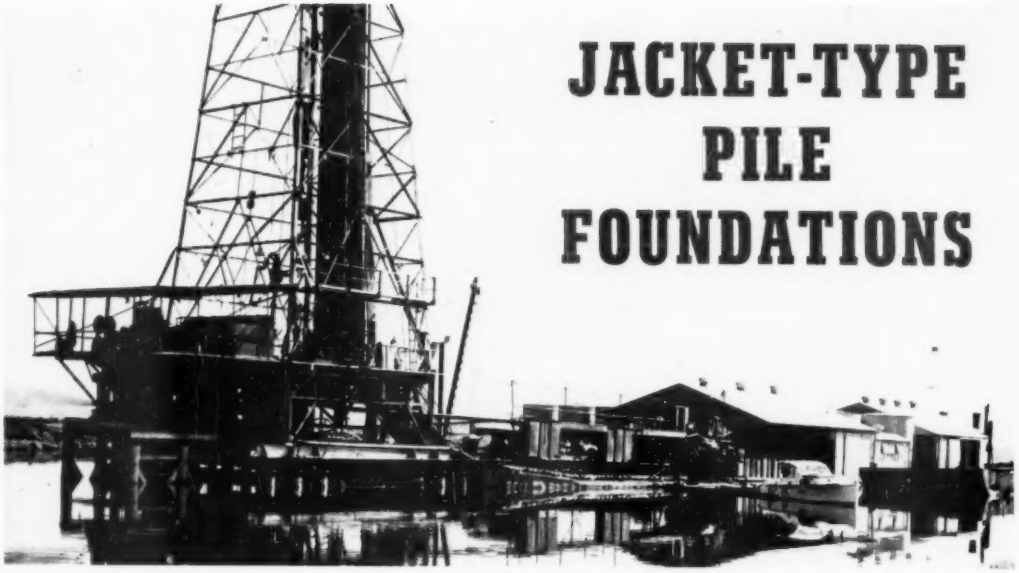


Richardson & Bass drilling installation at Pointe-a-la-Hache, showing the derrick, engines, and other equipment on jacket-type foundation, and mud pump, tanks, and boilers on a barge mounting

These structures, developed for offshore drilling, are highly adaptable to marsh locations

by M. B. Willey*

TWO wells, now being drilled by Richardson & Bass, Fort Worth, in Pointe-a-la-Hache field, Plaquemines Parish, Louisiana, employ jacket-type foundations with steel H bearing piles for the derrick draw works and engines. Boilers, mud pumps, pipe racks, and other auxiliary equipment are mounted on a converted D.P.C. barge approximately 230 ft. long and 45 ft. wide. Experience to date indicates that this type installation will give results and economies comparable to the use of the standard drilling barges.

The jacket-type structure was originally developed to provide a safe and stable foundation for drilling in deeper waters offshore. A large proportion of the wells in the Gulf of Mexico have been drilled from such platforms, and the satisfactory manner in which they function indicates that they probably have a wider field of usage, especially for structures frequently salvaged and subject to vibratory forces which must be restrained.

The drilling foundations consist of four component parts—the derrick jacket and platform and the engine jacket and platform. In addition thirty-seven 12-in. H bearing piles, 80 ft. in length are used.

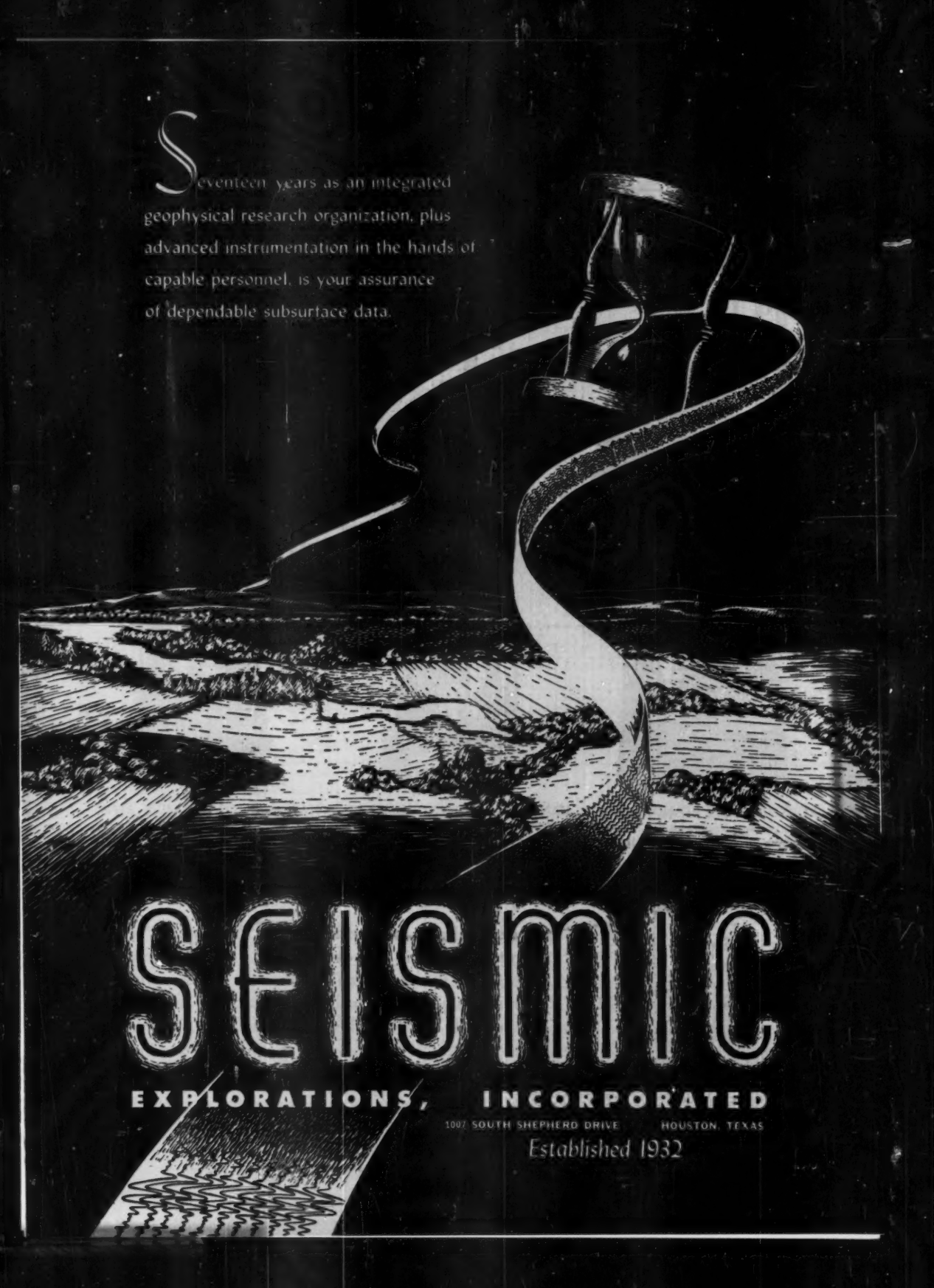
The weights of these units are roughly as follows:

	Tons
Derrick jacket	36
Engine jacket	14
Derrick platform	18
Engine platform	8
Piling	78
Total	154

The installation of the foundation is extremely simple. On arrival at the location the main jacket is picked up and placed in correct orientation. The small engine jacket is then set after which pilings are inserted in the jacket columns and driven. When this operation is completed, pilings are cut off by a torch to the proper elevation and platforms installed.

Prefabricated steel jacket platforms, derrick substructure, and piling arriving on location at Lake Lery, La. Commuting amphibian plane for the drilling superintendent also is shown

*Chief engineer, J. Ray McDermott & Co., Inc., Harvey, La.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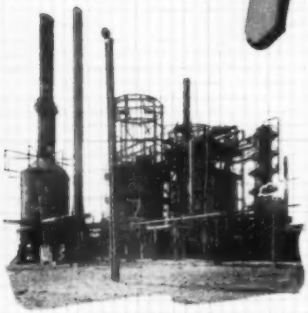
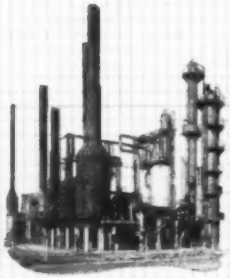
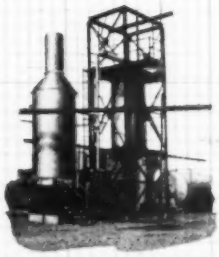


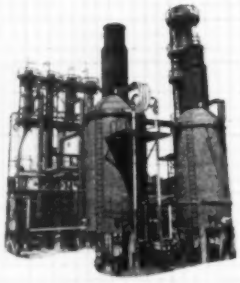
WOOD RIVER OIL & REFINING CO., INC., Hartford, Ill. – 10,000 B/D Straight Run and Cracked Gasoline Reforming and Gas Oil Cracking.



BARECO OIL COMPANY, Wichita, Kansas – 4,000 B/D Straight Run and Cracked Gasoline Reforming.



SHALLOW WATER REFINING COMPANY, Shallow Water, Kansas – 1,000 B/D Straight Run and Cracked Gasoline Reforming and Gas Oil Cracking.



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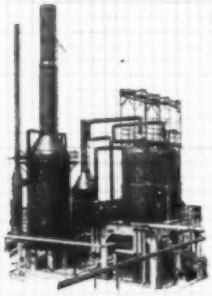
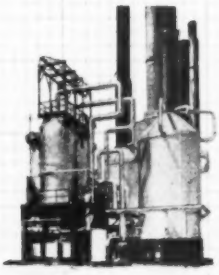


KANOTEX REFINING COMPANY, Arkansas City, Kansas – 4,200 B/D Straight Run and Cracked Gasoline Reforming.



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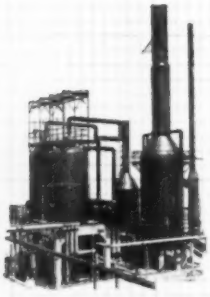

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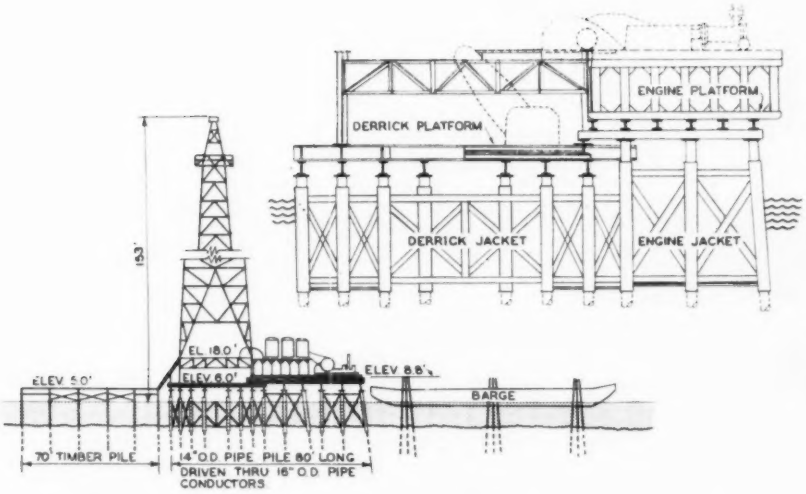


Upper right: Elevation of the jacket-type drilling platform used by Richardson & Bass in Pointe-a-la-Hache drilling

Lower left: Over-all elevation of the location piling and foundation arrangement. Total length is 246 ft.

Plates bolted to the lower structural members of the platforms are then welded to the piling and the structure is complete, ready for the installation of a preassembled, four-post derrick substructure, an engine substructure, and the erection of the derrick. Lumber, securely fastened to the derrick platform during fabrication, provides a subfloor during operations. Additional beams are also installed for a deadline tie-down and a 14-ft. pipe is welded securely in the derrick jacket at the proper location and angle to form a conductor for the rathole pipe.

Upon completion of the well, the salvage of the structure can be accomplished by the reversal of the above process. The cap plates can be unbolted from the two platforms so that the latter can be picked up and set off on a barge. Piling can then be pulled, although the assistance of a jet will probably be necessary. The final operation of picking up the two jackets can be done quickly and the foundation will then be ready to proceed to the next location.

Installation of Foundations

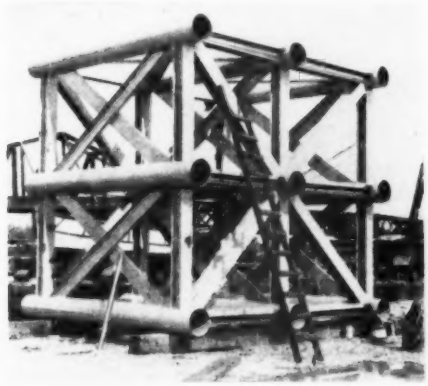
The first of these foundations was installed in 3½ days of 10 hours each. The well was spudded July 31, 1949, and on August 25 was drilling at approximately 8,900 ft. Three hundred and eight feet of 20-in., and 3,100 ft. of 13⅜-in. casing has been set. The fact that this well is a directional hole has materially retarded the drilling speed.

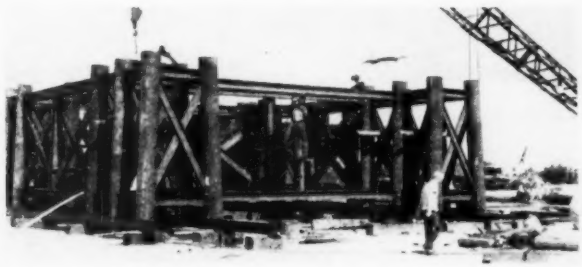
The second foundation was installed in 3 10-hour days. The well was spudded on August 4 and on August 25 was drilling at approximately 10,300 ft. Two hundred and seventy-two feet of 16-in. and 2,976 ft. of 10¾-in. casing has been set. The contemplated depth of both wells is 11,000 ft.

A third foundation has recently been completed for a Richardson & Bass exploratory well in Lake Lery, located approximately 15 miles north of Pointe-a-la-Hache field. A mechanical drilling rig will be used at this location. The structure is identical with the first two, except that an additional small jacket is used for supporting one pump directly behind the engines. Only one barge is used and the pipe racks are of conventional wood piling and cap design. The jackets and platforms can be readily converted to use with the steam rigs at Pointe-a-la-Hache. A fourth foundation is now being fabricated for installation early in September.

As compared to conventional wood piling, the first cost of a steel jacket and pile foundation is many times greater and when first scrutinized, such expenditures would not appear to be feasible. Several factors, however, more than counterbalance this large difference in initial expense. In comparison with the wooden-pile foundation, the steel pile-jacket type has the following points in its favor:

1. A 100 per cent salvage value.





Left: Engine jacket platform being prefabricated before being loaded on a barge for transportation to location. Below: Derrick jacket platform is shown being erected in the Harvey, La., yards

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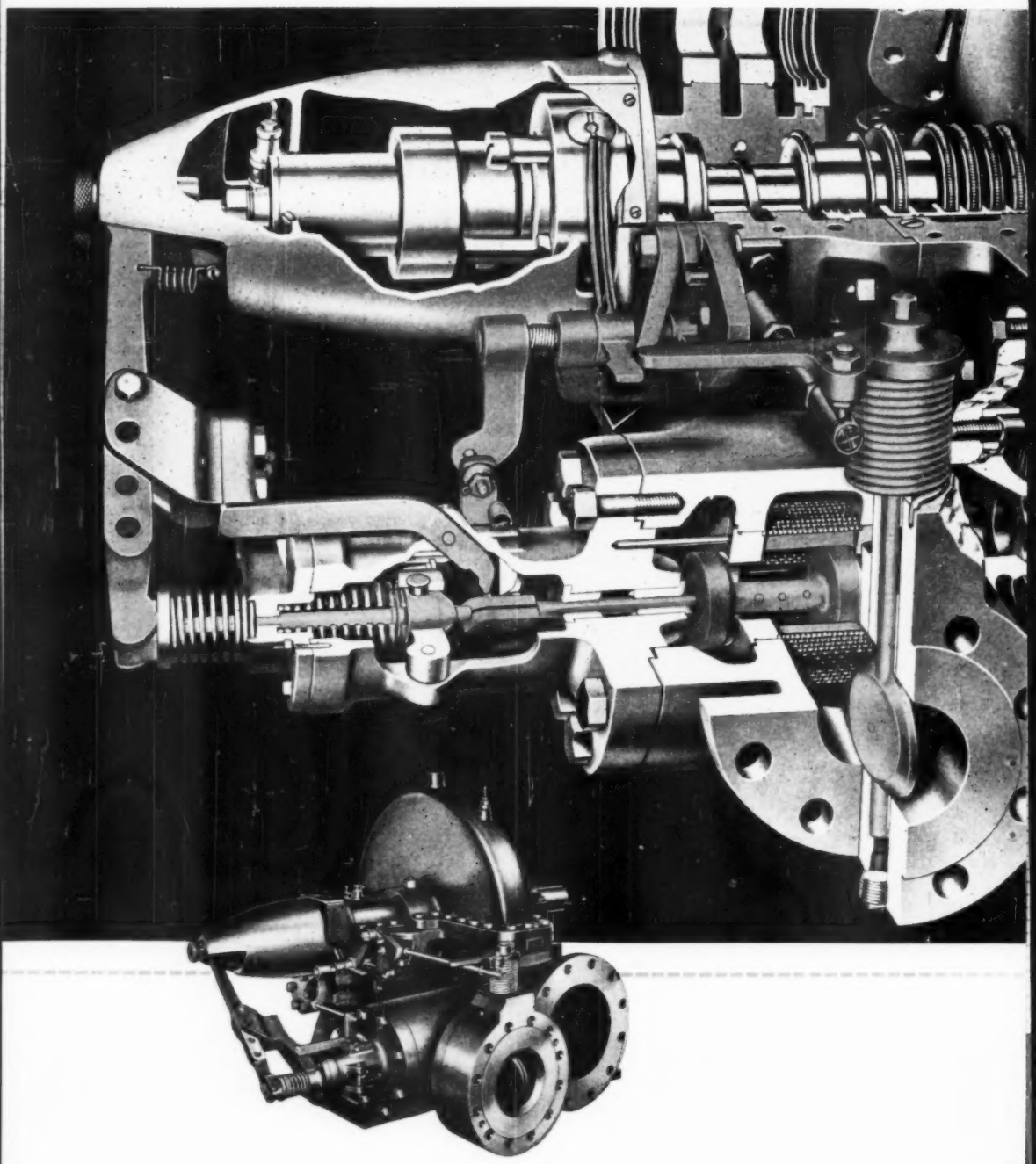

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2. Greatly reduced time and cost in erection, salvage and reerection. This factor applies to rig down time as well.

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Preliminary estimates indicate a payout of the difference in cost in about four and one-half moves, from reduced material replacement and salvage and reerection costs. On this basis alone the expenditure is justified where a sufficient drilling program is contemplated. This, however, is the minor consideration.

Of far greater importance is the saving in drilling time which, it now appears, will be from 11 to 14 days per well. Whereas foundations using wood piling and bracing required an average of 14 days for salvage and reerection, this operation can be accomplished in 6 days with the new-type structure.

As the work of installing the steel-jacket foundation is done with a derrick barge and not an ordinary pile driver, it is not necessary to completely tear down the derrick and substructure. The starting legs of the derrick to the top of the "V" can be left intact and moved in one piece as can also the derrick substructure. Furthermore, the derrick barge is available for handling the draw works, engines, etc. Several days' time in tearing down and rigging up equipment can therefore be saved.

Experience to date also indicates that there will be an additional week to 10 days decrease in actual time spent in drilling due to better and cleaner working conditions and higher permissible operating speeds. By the time this article is published some of these foundations will have been salvaged and reerected, the rig moved and reset, and another well spudded. It is intended to report this move and the time consumed so that an accurate check of the estimated savings given above can be made.

Drilling in this field is under the supervision of C. E. Radcliff, drilling superintendent. M. C. Fontenot is district superintendent, and R. B. Kelley, district engineer and geologist. Design of the foundations to their specifications and suited to the existing conditions was made by J. Ray McDermott & Co., Inc., Harvey, La., who also did the fabrication and installation.

Rich-Oil Stabilization

(Continued from page 56)

is to set the propane recovery and extent of ethane removal. An assumption of the lean-oil quantity to the top of the absorption section makes it possible to complete a material balance around the tower, since all of the methane and none of the butanes will appear in the dry gas leaving overhead.

When design and operating experience is available, the assumption of lean-oil quantity can be made quickly and accurately. A suggested method for computing the lean-oil quantity[2] assumes equality of the ratios of the two key components in the feed and in the vapor to the absorption section. Our design and operating experience does not bear out either the assumption of the equality of the key component ratios or the suggested method of computing the lean oil.

With the material balance completed, the bottoms composition is known and an initial-boiling-point calculation will determine the bottoms temperature, once the tower pressure is set. At this point it is essential that the temperature level of the reboiling medium be considered, and that the bottoms temperature and pressure be far enough removed from the critical conditions of the deethanized material so that the required separation is possible.

The bottoms-temperature calculation is a function of the characteristics of the lean oil. Depending on the particular set of "K" values chosen, differences of as much as 100° in the calculated and observed values were found. An empirical correction for the lean-oil "K" values may be developed from operating data that is a function of the characteristics of the lean oil and the degree of stripping in the still.

The total heat input to the reboiler and preheater can be determined by an over-all heat balance on the tower. It is impossible to generalize on the distribution of the heat between the preheater and the reboiler as each design must be studied from the standpoints of feed composition, propane recovery, temperature, and pressure. A recent article[3] states that it is usually not economical to put more than 30 per cent of the heat into the preheater. We have not found any justification for such a statement. One plant now in operation takes approximately 60 per cent of the heat in the preheater, and the remaining 40 per cent gives sufficient reboiler vapor to completely deethanize the rich oil. A fairly good approximation is the richer the feed and higher the recovery, the more heat will be required at the reboiler.

With the amount of heat to the reboiler fixed, the bottom-tray temperature is assumed. A heat balance around the bottom of the tower sets the amount of vapors to the bottom tray, which when added to the bottoms liquid gives the tray liquid composition. An initial-boiling-point calculation is made to check the bottom-tray temperature assumption.

The top stripping-tray liquid can be determined by tray-to-tray calculations over the stripping section. The point of methane injection into the tray calculations was originally approximated. When operating data became available, a method was devised to determine the amount and point of injection.

To determine the vapors rising to the absorption section, heat balances and flash calculations are made around the heat-exchanger section. Knowing the dry-gas composition and quantity from the over-all material balance, and the assumed lean oil, this vapor can be checked with an absorption calculation.

If this check is reasonably close, the assumptions made in the course of the calculations were correct. If the composition does not check, new assumptions as to lean-oil quantity, heat distribution between the preheater and reboiler, or number of trays, must be made and the calculations repeated.

Although the discussion has been limited to rich-oil stabilization in gasoline plants, this process is, of course, equally applicable to refinery and cracking-plant fat oils.

A plant nearing completion at Big Lake, Tex., will use a preheater-reboiler type of stabilizer into which the wet gas will be fed directly without an initial absorber. Wherever absorption pressure will permit such a design, it will further reduce initial plant investment.

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1. Whistler, A. M., Fluor Corp., Los Angeles, Petroleum Refiner, December 1946.
2. Kniel, Ludwig, Petroleum Refiner, November 1948.
3. Hannah, J. C., Petroleum Refiner, August 1949.

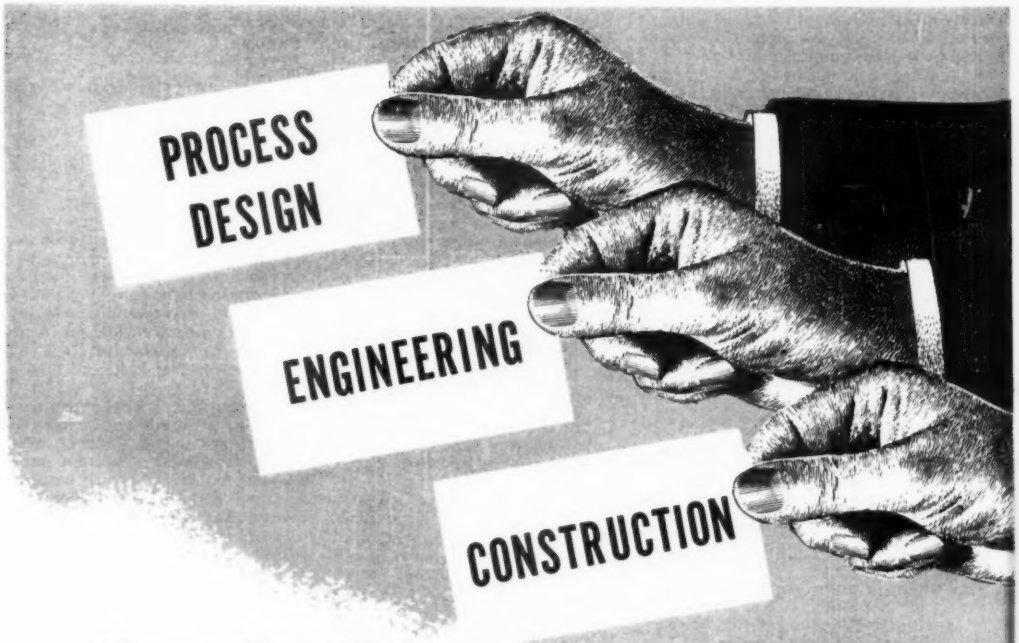
Evolution of the Petrochemical Industry

(Continued from page 67)

This frequently has advantages because of uniform feed composition, freedom from sulfur compounds, and the carbon oxides, and higher ethylene concentration in the crude streams. As indicated by the byproduct streams from refineries, there is no reason to limit petroleum feed stocks for cracking to ethylene to the light hydrocarbons. Any hydrocarbon oil or gas may be so cracked. Optimum yields from ethane are obtained, by modern cracking methods, of 60 per cent or better, whereas with normally liquid feed stocks the ultimate yields of ethylene average from 28 per cent by weight for a paraffinic feed to 12 per cent for a highly naphthenic one.[2]

Cracking of light hydrocarbons for olefins has generally in the past been in tube furnaces, usually with alloy-steel tubes to give maximum permissible temperatures of about 1,300° F. Pressures are desirably near atmospheric or even lower, and steam is sometimes added to reduce carbon deposition.

Even under the best conditions tube furnaces are expensive to maintain.



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and frequently optimum temperatures above 1,300° F. are desirable. Consequently, a more promising method now appears to be the pebble heater, wherein a circulating stream of smooth ceramic pebbles is highly heated by combustion gases in an elevated chamber and flows by gravity through a throat to a reactor or cracking chamber below it, where heat is reduced by the cracking of feed stocks at temperatures up to 3,000° F. if desired. This process is under active development, and a large commercial unit has been built by Phillips at Borger, Tex. The advantages of the pebble heater over tube furnaces are higher temperatures, better yields, less labor, and lower initial investment.

In discussing light-hydrocarbon feed stocks for ethylene, it should be recognized that inherently propane can never be as efficient as ethane because of the concomitant production of methane. This can be shown:

$$C_2H_6 \rightarrow C_2H_4 + H_2$$

$$C_3H_8 \rightarrow C_2H_4 + CH_4$$

The vapor pressure of propane is low enough to permit its transportation as a liquid. Because of its popularity for domestic and industrial uses, however, it is often worth 5 cents per gallon or more as compared with about 0.6 cents per gallon for an ethane-rich deethanizer stream from a natural-gasoline plant. With these feeds, 90 per cent pure ethylene may be produced for about 2 cents per pound from 0.6-cent ethane as compared with 3.8 cents from 5-cents-per-gallon propane. If the propane costs only 2.5 cents per gallon, however, ethylene is obtainable at the same purity for about 2 cents per pound.[1] This illustrates the possible price ranges using a pebble heater-continuous adsorption type of process. In the cracking of propane, about the equivalent of 50 per cent of the weight of ethylene is produced as propylene.

As indicated previously, propylene is derived almost exclusively by the cracking of other hydrocarbons, either liquid or gaseous. The largest quantities derive from thermal and catalytic cracking of crude-oil fractions as shown in Table 2, where it is indicated that the mol per cent propylene is 2 to 3 times that of ethylene in fluid catalytic cracking residue gases.

Propane-Propylene Mixture

Propane-propylene mixtures are often recoverable from refineries, and can be separated into high-purity components by conventional distillation, although the separation is more difficult than would be expected from straight vapor-pressure considerations.

The C_3 olefins are the second most popular group of this family of petroleum hydrocarbons, and the first to permit a differentiation between the normal and the iso structure. Isobutylene is the olefin of isobutane. The normal butenes consist of butene-1 and cis and trans butene-2 isomers, all having distinct physical properties. These are also isomeric with isobutylene.

TABLE 2—RESIDUE GAS COMPOSITIONS FROM SELECTED FLUID CATALYTIC CRACKING FEED STOCKS (NOT INCLUDING NITROGEN AND CARBON OXIDES)

Feed stock—	Paraffinic gas oil	Light gas oil	50% reduced crude	Heavy gas oil	Average
Per cent residue gas (by wt.)	6.6	8.8	6.4	8.4	7.6
Component mol. per cent:					
Hydrogen	12	8	23	12	13
Methane	30	11	23	34	25
Ethylene	10	10	7	7	8
Ethane	19	26	13	14	18
Propylene	20	35	24	22	26
Propane	9	10	10	11	10

Again, thermal and catalytic cracking units are the most fruitful source of these compounds, and during World War II, they were recovered in very large quantities for synthetic rubber and aviation gasoline purposes. These compounds are also readily made by catalytic dehydrogenation of butanes. Although the number of derivatives of the butanes is not as impressive as from ethylene, from a tonnage point of view, they outrank all other light olefins.

Although the acetylenes constitute a large family, only the simplest member, C_2H_2, is of widespread commercial importance. It has traditionally been prepared from calcium carbide and water. New thermal and electric cracking methods for hydrocarbons are now being introduced in this country, however, which promise to compete with calcium carbide as a leading source of acetylene.

The electric-arc cracking of methane and ethane to acetylene with good yields was practiced industrially in Germany during World War II. The thermal cracking process is developing in this country around refractory regenerative furnaces. A later variation now under consideration is the thermal cracking brought about by heat generated from partial oxidation of the hydrocarbon feed.

The temperatures required for cracking hydrocarbons to acetylene increase with decreasing molecular weight. In the regenerative furnace process, a temperature of 1,450° C. for methane has been reported for satisfactory yields, or 1,200° C. for C_2, C_3, or C_4 feed stocks with 0.1 second reaction time and 6.5:1 steam to hydrocarbon ratio.[1] Yields per pass for C_4 feed stock are reported up to 27.0 per cent and ultimate yields with recycle of 52 per cent.

It is obvious from these temperatures, which are paralleled in the oxidative cracking process, that high-temperature apparatus constructed from specialized ceramics is necessary. Acetylene is not the only product from cracking hydrocarbons, but ethylene, carbon black, hydrogen, and aromatic oils are also formed in varying amounts. In the southwestern area of the United States, where hydrocarbon fuels (and therefore power) is cheap, the costs of acetylene at 90 per cent concentration are predicted to be surprisingly close together for the three processes mentioned at about 8 cents per pound. Water absorption is one of the preferred ways to separate acetylene from the cracked-gas streams.

An important subclassification of the olefins is the diolefins, which also attained prominence during World War II. The most important one is, of course, butadiene, which was manufactured for the government synthetic-rubber program during the war in excess of 400,000 tons annually. As indicated previously, butadiene was derived mainly from the dehydrogenation of butenes, which were in turn mainly obtained as byproducts of crude-oil refining.

Other diolefins have also reached commercial importance, including the hydrocarbon isoprene or 2-methyl-1,3 butadiene. This is obtainable from the processing of turpentine or from petroleum hydrocarbons. The main use also occurs in manufacturing polymers.

The occurrence and recovery of cycloparaffins such as cyclohexane, cyclopentane, methyl cyclopentane, and methyl cyclohexane from natural gasoline by intensive fractionation has been described earlier in this article. This constitutes one of the major commercial sources of these compounds. They also are found to be present in crude oil frequently, and in cracked gasoline, but are seldom separated as such. They can, of course, be synthesized from the corresponding aromatics by hydrogenation, but this is generally not economically feasible. Concentrated fractions of cycloparaffins separated from natural gasoline have high blending value in aviation gasoline, and consequently, they are often worth more in this use than as chemical raw materials.

The cycloolefins result from pyrolytic cracking operations in crude-oil refineries. They are also obtainable by dehydrogenation of the corresponding cycloparaffins, although the related aromatics are also produced at the same time. Theoretically, they are also obtainable by dehydrocyclization of normal paraffins together with selective hydrogenation. Because of their reactivity and unique structure, the cycloolefins are attracting increasing attention in chemical syntheses.

As in the case of the olefins, there

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are also cyclic diolefins, at least one of which has attracted commercial attention. This is cyclopentadiene, which is obtainable as a byproduct from the cracking of light hydrocarbons. It is obtainable by the dehydrogenation of cyclopentane. The commercial status of the cyclic diolefins is not comparable with that of the aliphatic ones.

Aromatics occur naturally in western United States and some Russian crude oils. They also occur in Mid-Continent natural gasoline to a small extent. Usually their concentration is so small in natural gasoline that it is not economically feasible to separate them.

One of the most practical methods for obtaining aromatics from petroleum fractions is by selective dehydrogenation of the corresponding cycloparaffin. During World War I, very large quantities of toluene were made by this method in the hydroforming process, in which methylclohexane was included in the feed stock. The cycloparaffin may also be directly dehydrogenated with good yields, although the separation of products is sometimes difficult. Low-pressure gas cracking is now receiving increasing attention as a method for synthesizing aromatics from hydrocarbons. Almost all cracking processes produce aromatic oils containing toluene, benzene, naphthalene, etc. Several theories exist as to the formation mechanism for aromatics in cracking processes, but one of the most popular is based on acetylenes as primary units, which may combine with olefins or diolefins.

It may be expected that in the future, petroleum sources will become increasingly important in furnishing aromatics, particularly benzene, toluene, and naphthalene, for the chemical industry. These will supplement the production of these products from byproduct coke plants in a degree depending on the economics and demand.

Refineries vs. Natural-Gasoline Plants

An oil or chemical company contemplating the manufacture of chemicals from hydrocarbons may consider either refineries or natural-gasoline plants as sources of raw materials. No general rule can be prescribed, and each case must be considered on its own merits. Certain generalities may be stated, however.

In the majority of cases, the light hydrocarbons available from a gasoline plant, up to the C_4 fraction, are paraffins, whereas from a refinery they will be mixed paraffins and olefins. The greatest number of organic chemicals are derived from the olefins, because of their greater reactivity. Consequently, the light paraffins from a gasoline plant are most commonly converted to olefins by dehydrogenation or pyrolysis. It would thus be thought that when olefins are the desired intermediate, the refinery would always be first choice. This is not necessarily true.

Refineries are operated primarily to make fuels and lubricants. A chemical program attached to a refinery is thus almost always of secondary importance, and the decisions regarding starting and stopping units, changing operating conditions, changing feed stocks, eliminating sulfur compounds, etc., will be made for the welfare of the fuels and lubricants program. On the other hand, once a natural-gasoline or recycling plant is put on stream, its composition of feed gas and products will remain quite stable for many years, with the exception of decline in field pressures as time goes on. The volume ratio of liquefied petroleum gas to natural gasoline will also stay relatively fixed.

The simplest of the olefins, ethylene, is the most versatile, and is attracting greatest attention at the present time. The potential user of crude or refined ethylene may either turn to byproduct refinery streams or deliberately prepare ethylene by one of the several pyrolytic methods now available. Table 2 gives compositions of typical residue gas streams from fluid catalytic cracking of the designated petroleum fractions, not including nitrogen or the carbon oxides, that are usually present to the extent of several per cent.

Table 2 presents some of the problems of using refinery residue-gas streams. Most chemical users of ethylene require purities of 80 per cent or better. In considering the average residue-gas composition shown as a source of high-purity ethylene, it would be feasible to consider first the use of a continuous adsorption process for making a division between propane plus propylene as a bottom fraction, ethane plus ethylene as an intermediate one, and methane plus hydrogen as an overhead one. This would yield a C_2 fraction of approximately 50 per cent ethylene, which could be further concentrated by using solutions of copper salts, selective solvents, or straight high pressure-low temperature distillation to about 95 per cent purity. If this procedure was followed, a byproduct ethane-rich stream would be available for further separate cracking to ethylene by one of several methods.

As an example of availability of C_3 and C_4 fractions from a modern refinery, a large Gulf Coast plant produces approximately 8,000 lb. of ethylene, 34,000 lb. of ethane, 22,000 lb. of propylene, and 39,000 lb. of propane for each 10,000 bbl. of daily crude-oil charge. These are produced in mixed-gas streams, and it is usually desirable to separate the components (at least in part) before undertaking chemical conversions.

The average ratio of liquefied petroleum gas to natural gasoline produced from all United States natural gasoline and recycling plants in 1948 was roughly .75 to 1 on a volume basis. It is impossible to specify the volume of light hydrocarbons available from refineries in general because of the wide variation in crude-oil compositions, processing methods, and conditions.

It is characteristic of the petrochemical industry that very few small installations are made. The plants built are usually large ones of complex design, and require large refining, natural-gasoline, or natural-gas operations to support them. If it is decided to attach a petrochemical program to a refinery, it should generally be a large one, to even out the volume and composition of chemical raw materials.

Derivatives of Hydrocarbon Chemicals

It is safe to say that the carbon and hydrogen parts of all organic molecules are derivable from the natural and processed petroleum hydrocarbons. Much has been written regarding these hundreds of derivatives, resulting from halogenation, oxidation, pyrolysis, nitration, etc. Phosphorus is another element incorporable into the hydrocarbon molecules, along with the others just mentioned. From 22 basic derivatives of ethylene at least 40 other well-known commercial chemical products are manufactured. From ethyl alcohol, for example, ethyl ether, acetone, ethyl chloride, butadiene, buna S, buna N, ethyl acetate, cellulose, acetate, acetic acid, acetic anhydride, chloroform, and others are manufactured wholly or in part.

The opportunities from acetylene are even greater than from ethylene, although this compound is more difficult to handle because of its greater activity. The German chemical industry had made greater use of acetylene as a basic raw material than other countries up to 1945, and some of these techniques are now being adopted in the United States. It is safe to say that in the future much more acetylene will be derived from the decomposition of light petroleum hydrocarbons than is presently the case, because of active development in several companies and universities.

The butanes and butenes were the backbone of the United States synthetic-rubber and aviation-gasoline programs during World War II. In the government butadiene program for G.R.-S. general-purpose synthetic rubber, this is indicated by the fact that out of a total of 12 plants, 9 made this product from petroleum hydrocarbons, mainly refinery butenes or normal butane. The other three plants used ethyl alcohol as a raw material, and could not compete in cost of manufacturing with the butane and butene dehydrogenation plants. The three lowest-cost-of-manufacture government butadiene plants operating today are two butene dehydrogenation plants and one butane dehydrogenation unit.

The picture is similar with the other hydrocarbons, except that the versatility decreases with increasing molecular weight. The commercial possibilities of cyclohexene, for instance, are not comparable with those of ethylene or propylene. A comprehensive relationship of all of the light hydrocarbons and their derivatives has been prepared by the Bureau of Mines.[4]

One of the most interesting postwar developments in the United States (which was stimulated by wartime developments in Germany) is the Fischer-Tropsch process for synthetic hydrocarbon fuels and oxygenated chemicals. Oddly enough, the process was originally studied as a source of oxygenated chemicals from hydrogen-carbon monoxide raw materials. In Germany, coke and steam were the basic raw materials, whereas in the United States methane together with steam and/or oxygen have been most actively considered.

The primary interest in the Fischer-Tropsch process has been in synthesis of fuels in the United States, although the oxygenated chemical byproducts present interesting possibilities. Since the hydrocarbon products (liquid and gaseous) are highly olefinic, they might also be considered as chemical raw materials. Economically, it is possible that some synthetic fuels and chemicals may be manufactured by this method from natural gas, although the heavy fuel commitments for this gas as such militate against this. The estimated production of water-soluble organic chemicals from a 7,000-bbl.-per-day Fischer-Tropsch plant is given in Table 3.[5]

Table 3 refers to the water-soluble organics obtainable in a water layer when 7,000 bbl. per day of oil layer constituting the synthetic fuel is produced. Some oil-soluble oxygenated

TABLE 3—ESTIMATED PRODUCTION OF WATER-SOLUBLE ORGANIC CHEMICALS FROM 7,000-BBL.-PER-DAY FISCHER-TROPSCH PLANT

Chemical—	Est. prod., lb./yr.
Acetaldehyde	9,100,000
Propionaldehyde	1,930,000
n-Butyraldehyde	2,750,000
Acetone	11,200,000
Methanol	730,000
Methyl ethyl ketone	4,780,000
Ethanol	63,680,000
n-Propyl alcohol	14,400,000
n-Butyl alcohol	4,370,000
n-Amyl alcohol	1,060,000
Acetic acid	24,700,000
Propionic acid	8,700,000
Butyric acid	4,200,000
Methyl propyl ketone	600,000
Total	152,200,000

organics are also contained in this layer, but are not readily recoverable.

It may be deduced that separation problems of major proportions result when the products listed in Table 3 are to be produced commercially pure. It may also be deduced that a relatively small synthetic-fuel program of this type in the United States would have a major effect on the markets for the oxygenated compounds shown. This is another illustration of the relative magnitudes of the fuel and chemical industries in this country. In the example given, the weight ratio of fuel to chemicals is about 5:1, and while the effect of ten 7,000-bbl.-per-day plants would be minor on present United States motor-fuel production, it would be tremendous on the production of this class of chemicals.

Several factors will probably delay the development of a Fischer-Tropsch chemical program in this country. One is the heavy commitments for natural gas in proven reserves; another is the heavy investment and steel requirements, and a third is unsolved engineering problems. The possibilities should not be disregarded, however. One American demonstration plant is now under construction in Texas which is being partly financed by the Government.

A corollary process to Fischer-Tropsch, the oxo, which was also developed commercially during World War II in Germany, has attracted considerable attention in this country. At least two oil companies and one chemical company are now applying this process commercially to the manufacture of high molecular weight aldehydes and alcohols. The oxo process produces aldehydes by the catalyzed reaction of hydrogen and carbon monoxide with olefins, producing aldehydes with one more carbon atom than the olefins used. The aldehydes may be hydrogenated to the corresponding alcohols. Although the process may employ any olefin, the greatest interest is with those having 6 to 18 carbon atoms. Lower-molecular-weight aldehydes and alcohols are generally believed to be produced cheaper by conventional methods. The oxo process can be applied readily to olefins derived from the Fischer-Tropsch synthesis.

The perspective of relative quantities must be kept in discussions of this sort. In 1946, the total production of synthetic organic chemicals including synthetic rubber was 7,000,000 short tons. The annual production of liquefied petroleum gases and natural gasoline was about 10,000,000 tons, while total liquefied products including crude oil was about 300,000,000 tons. Thus, less than 3 per cent of the total petroleum liquefied products would have equaled the combined weight of all organics. This implies that the opportunities for chemical expansion using petroleum raw materials are unlimited, and explains in part the rapid growth.

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BOOKS

SECONDARY RECOVERY OF OIL. By Oscar F. Spencer. Published by the Mineral Industries Extension Services of Pennsylvania State College, State College, Pa. 456 pp. $4.50.

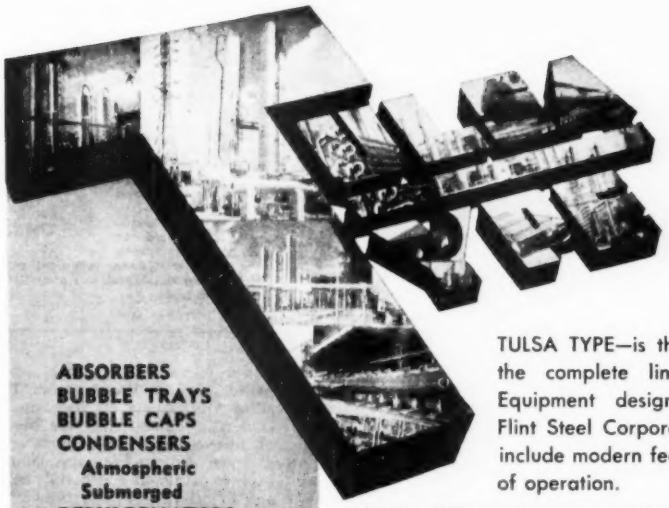
This book covers the two widely used methods of secondary recovery, namely, water flooding and injected gas drive. The practices cited in the text are those of the eastern oil-producing district, while the fundamental principles may be applied to any producing district that is operating with these two methods of secondary recovery. The subject matter covered by this text includes: Introduction; Geological Factors Influencing Secondary Recovery; Predicting a Reservoir's Susceptibility to a Water Flood; Well Spacing and Flood Patterns in Water Flooding; Water Source and Purification; Design and Construction of Water Pumping Plants; Development and Operation of Water Flooding; Correcting a Heterogeneous Permeability Profile; Reconditioning Wells in Water Flooding; Estimating Costs of Water-Flood Projects; Predicting a Reservoir's Susceptibility to an Injected Gas Drive; Factors Affecting Oil Recovery in an Injected Gas Drive; Well Spacing and Well Patterns in Injected Gas Drive; Design of Injected-Gas-Drive Plants; Development and Operation of Injected Gas Drive.

ALCOHOL A FUEL FOR INTERNAL-COMBUSTION ENGINES. By S. J. W. Pleeth. Published by Chapman & Hall, Ltd., 37 Essex Street, W.C.2, London, England. 259 pp. 28s.

This volume presents a conspectus of the vast amount of experimental material that exists relating to the use of ethyl alcohol as a fuel for the internal-combustion engine. It opens with an introductory survey of both solid and liquid fuels and then deals with the production of ethyl and other alcohols from a variety of raw materials. Fuel requirements of automobiles, racing cars, and airplanes are considered in some detail and chapters are included dealing with the principles of the internal-combustion engine, the volatility of fuels, and the important subject of knock. Test procedures for the examination of alcohol blends in the laboratory are given and the book concludes with a discussion of the economics of substitute fuels, particularly the alcohols.

PRINCIPLES OF PETROLEUM GEOLOGY. By Cecil G. Lalicker. Published by Appleton-Century-Crofts, Inc., New York. 377 pp.

Stratigraphic and geographic distribution of petroleum distribution is given in detail in this work. Emphasis has been placed on principles of petroleum geology, the mode of origin of oil and gas structures, and petroleum-discovery methods. The oil and gas fields described have been selected from various petroliferous provinces of the world, and are grouped according to their origin. Consideration is given to the influence of geological factors on various types of recovery methods and valuation of oil and gas properties. The book is liberally illustrated, there being 157 drawings, such as structures, charts, and maps as well as several score tables.



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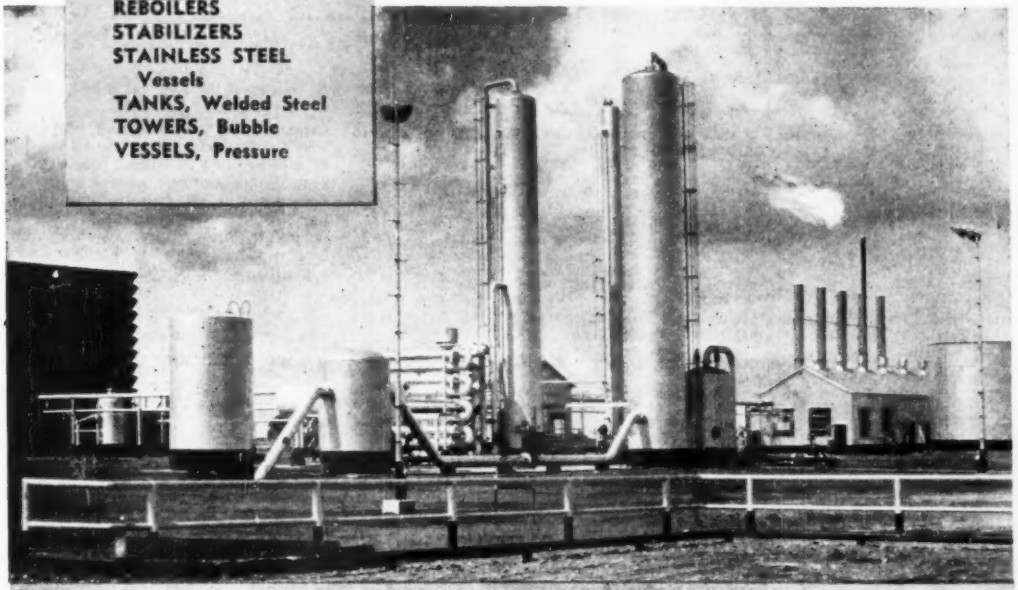

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

This department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in various phases of plant operation, as well as those connected with the marketing and utilization of petroleum products. Readers are invited to submit their problems to W. L. Nelson, technical editor. Inquiries must be signed, but only the initials will be printed.

Heating Value of Catalytic Gases

In last week's issue, C. R. N. inquired about the heating value of B.-B. cut and of cracked gases. Here are data on the cracked gases (propane and lighter).

Last week's issue showed that the heating value of B.-B. cut is almost constant. The same is true of the dry gas. Tables 2 and 3 show data on the propane and lighter gases. Although the somewhat limited amount of data does not justify a differentiation between the several processes, Table 1 is a summary of the findings of these two Questions on Technology.

TABLE 1—HEATING VALUES (GROSS) OF CATALYTIC PRODUCTS, B.T.U. PER POUND

	B.-B. cut	Propane and lighter
Fluid process	21,069	21,922
Houdry	21,186	21,912
T.C.C.	21,101	22,112
Average	21,140	21,940

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1. Grote and Olsen, Pilot Plant Evaluation of Fluid Cracking Catalysts, Pet. Refiner, Nov. 1947, p. 104.
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3. Dart and Oblad, Heat of Cracking and Regeneration in Catalytic Cracking, Chem. Eng. Progress, Feb. 1949, p. 110.
4. Ardern, Newton and Barcus, Catalytic Cracking of Cuts of Coastal Crude, Ind. Eng. Chem., 37, 546 (1945).

Diesel Fuel Blends—Diesel Index

In the September 1, 1949, issue, S.A.L. questioned us regarding the pour point of diesel fuel oil blends. Here is information on the behavior of blends with regard to diesel index.

The master's degree thesis at University of Tulsa of Claude M. Murray, Jr., entitled, "Pour Point Depression of Diesel Fuels," 1947, provides data by which the diesel index of blends can be investigated. The results with respect to diesel index are shown in Table 1 for five blends. In all of these the diesel index is nearly a linear function of the amount of each material in the blend. An average of all of the data indicates that the experimental blends are only 0.032 units lower than would be expected from an additive property. Twelve determinations were high by an average of 0.667 diesel index units, nine determinations were low by an average of 0.996 diesel index units, and four determinations show no variation from an additive behavior. Only the first blend in Table 1 indicates the possibility of finding stocks that give higher diesel indexes than two blending stocks would indicate.

TABLE 1—DIESEL INDEXES OF DISTILLATE BLENDS*

Per cent of low diesel index material in blend	Low stock A.P.I. / High stock A.P.I.	Diesel index of blend (1) Cat. Cr. 32.4 / Mid. C.-S.R. 34.5	(2) Cat. Cr. 32.4 / Ark.-S.R. 33.0	(3) Cat. Cr. 32.4 / Okla. Wax D. 33.0	(4) Cat. Cr. 32.4 / Okla. S.R. 37.4	(5) Okla. W.D. 33.0 / Okla. S.R. 37.4
0		40.5	40.5	40.5	40.5	56.1
10		42.3 (42)*				
20		44.3 (43.6)	41.9 (41.9)*	43.8 (43.6)*	44.5 (44.5)*	57.0 (57.0)*
30		45.5 (45.1)				
40		47.2 (46.7)	43.2 (43.3)	41.6 (46.7)	48.6 (48.5)	58.4 (57.9)
50		48.6 (48.2)				
60		50.3 (49.7)	44.0 (44.8)	51.0 (49.9)	52.5 (52.5)	58.9 (58.7)
70		52.3 (51.3)				
80		55.4 (52.8)	45.5 (46.1)	53.3 (53.0)	56.1 (56.5)	59.5 (59.6)
90		55.2 (54.4)				
100		55.9	47.6	56.1	60.5	60.5

*Numbers in parenthesis are computed diesel indexes if the property is additive.

TABLE 2—COMPOSITIONS AND GROSS HEATING VALUES OF SOME CATALYTIC GASES (FLUID C.C.)

	Percentages (gas volume) and heating value (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	Ave.
Hydrogen	22.5	5.6	25.3	21.5	14.1	12.0	13.0	13.0	12.0	10.0	7.0	4.0	13.3
Methane	5.3	8.3	4.6	26.9	5.2	21.0	23.0	25.0	21.0	26.0	15.0	18.0	16.1
Ethylene	6.6	6.0	6.4	8.0	6.6	11.0	8.0	6.0	10.0	12.0	8.0	6.0	7.9
Ethane	6.5	6.0	6.3	8.0	6.5	7.0	9.0	11.0	7.0	3.0	8.0	7.0	7.1
Propylene	45.2	56.7	43.9	27.2	53.1	29.0	21.0	12.0	35.0	51.0	34.0	28.0	36.4
Propane	13.9	17.4	13.5	8.4	14.5	20.0	26.0	33.0	15.0	4.0	28.0	37.0	19.2
Heating value, B.t.u. per lb.	21,953	21,479	22,040	22,506	21,662	21,996	22,154	22,277	21,956	21,729	21,753	21,751	21,922
Reference	(1)	(1)	(1)	(1)	(1)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	

TABLE 3—COMPOSITIONS AND GROSS HEATING VALUES OF SOME CATALYTIC GASES (T.C.C. AND HOUDRY)*

	Composition (weight per cent) and heating value (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(5)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Hydrogen	0.9	1.0	0.6	0.6	0.7	0.7	0.5	0.5	0.3	0.3	0.1	0.2	0.7	0.7	0.7	0.8
Methane	9.7	12.7	11.2	10.8	10.8	11.6	12.0	4.7	5.9	7.8	9.1	4.7	9.2	15.4	8.4	8.9
Ethylene	6.8	4.7	8.4	8.7	7.3	7.5	6.9	7.0	5.9	5.2	6.0	7.1	5.5	4.8	6.0	7.6
Ethane	8.9	11.0	12.5	10.2	9.6	9.2	8.9	4.7	5.9	7.8	6.1	7.2	7.3	8.7	2.4	7.7
Propylene	49.8	41.1	36.9	35.9	27.7	44.6	43.3	26.1	41.0	7.9	16.7	38.0	44.2	6.7	26.3	39.4
Propane	23.9	29.5	30.4	33.8	43.9	26.4	28.4	57.0	41.0	71.0	62.0	42.8	33.1	63.7	56.2	35.6
Heating value, B.t.u. per lb	21,997	22,157	21,998	21,984	22,069	21,981	21,913	21,818	21,713	21,926	21,928	21,663	21,908	22,294	21,980	21,977
Reference	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
Process	(T)	(T)	(T)	(T)	(T)	(T)	(T)	(T)	(T)	(T)	(T)	(T)	(T)	(T)	(T)	(T)

*Analyses computed from complete (wet) gas analyses. †T.C.C. ‡Houdry.

Cost-imating

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Coil-in-Box Equipment

COIL-IN-BOX equipment consists of a plate steel box reinforced on the outside with vertical buckstays (Cost-imating No. 41, July 28, 1949) with angles around the top, and with ties across the top. The pipe coil is supported at about 8-ft. intervals within the box and the weight of support for each pipe ranges from 1.5 to 2.1 lb. at each point supported. The cost (cents per pound) of steel is about as follows:

	M	L	M & L
Small structural	8-13	2-6	11-18
Large framing	8-9	2-3	10-12
Small fabricated boxes			9-12
Large boxes	8-10	4-6	12-16

The cost of cast-iron pipe and fittings is shown in Table 1, but Cost-imating No. 42 (August 4, 1949) must be consulted for the costs of wrought-steel pipe.

Cast iron is the preferred material but it is more expensive. The cost of pipe headers is indicated in Tables 3 and 4, and the number of branches to use on headers is indicated in "Pressure Drop in Condenser Box Headers" *(The Oil and Gas Journal, April 27, 1944, p. 54)*.

The boxes are often supported on a 6-in. concrete slab with 2-ft. 6-in. footings spaced at about 12 ft.

TABLE 1—APPROXIMATE COSTS (1946) OF FLANGED CAST-IRON PIPE AND FITTINGS

Diam., in.	Flanged pipe $/ft.	Labor ft.*	Elbows $ each	Tees $ each
2	70	.58	4.30	5.30
3	1.41	.64	4.75	6.50
4	1.65	.80	6.45	7.25
6	2.36	1.09	11.70	14.30
8	3.65	1.80	18.00	21.80

*Installed in coils, and based on standard lengths of runs.

TABLE 2—APPROXIMATE COST (1946) OF BENDS, DOLLARS EACH

Size of bends—Diameter, in.	C x C, in.	Flanged C I	Screwed, Ex. hvy. M I
1	$1^3/_4$		.56
1	$2^1/_2$		.71
1	3		.81
$1^1/_2$	$1^3/_4$		1.71
$1^1/_2$	3		1.08
$1^1/_2$	6		1.64
$1^1/_2$	8		1.88
2	3		1.16
2	4		1.89
2	6		1.99
2	9	5.20	
2	12	5.60	
3	5		2.63
3	7		4.00
3	8		5.07
3	$9^1/_2$	6.40	
3	12	7.60	
3	22	15.00	
4	6		4.60
4	7		4.85
4	9	9.10	6.58
4	12	10.60	7.10
4	14	11.60	
4	16	13.10	
4	22	17.30	
4	30	24.00	
6	10		8.70
6	12	18.60	
6	17	20.70	
6	22	21.90	
6	30	32.00	

TABLE 3—APPROXIMATE COST (1946) OF EXTRA HEAVY STEEL PIPE HEADERS AND STANDARD BRANCHES*

	Cost of branches or header of these diameters—2 in.	3 in.	4 in.	6 in.	8 in.	10 in.	12 in.
Branches†, each	1.68	3.50	6.40	7.75			
Headers‡, each:							
4 ft. length	6.95	10.00	16.80	26.20	41.50	61.50	68.50
6	7.75	11.40	18.90	31.30	50.50	74.00	84.50
8	8.50	12.80	21.60	36.50	59.50	88.00	100.00
10	9.30	14.15	24.20	41.60	68.50	101.00	117.00
12	9.70	15.00	25.80	45.00	74.00	109.00	126.00
14	10.10	15.60	27.20	47.80	79.50	117.00	136.00
16	10.50	16.40	29.00	51.20	85.50	125.50	147.00
18	12.15	17.20	30.50	54.20	91.00	134.00	157.00
20	12.60	18.00	32.00	57.50	96.50	142.00	167.50

*Example.—A 6-in. header 12 ft. long with eight branches 2-in. diameter, $45 + 8 × 1.68 = $58.40. †Includes 1-ft. std. pipe, one R-R union and one weld. ‡Includes two blind flanges, three flanges, two gaskets, one weld, two sets bolts, and one fitting job, but no branches.

TABLE 4—APPROXIMATE COST (1946) OF CAST IRON HEADERS AND BRANCHES*

	Cost of branches or headers of these diameters—2 in.	3 in.	4 in.	6 in.	8 in.	10 in.	12 in.	14 in.
Branches†, each	1.70	2.50	3.70	5.65	7.90			
Headers‡, each:								
6 ft. length		15.30	22.30	31.80	49.50	69.00	90.00	118.00
8		18.50	26.70	38.60	59.00	82.00	111.00	139.00
10		21.60	31.10	45.40	68.30	95.00	128.00	160.00
12		24.80	36.20	52.20	77.70	108.00	146.00	181.00
14		28.00	40.00	59.00	87.00	121.70	161.00	202.00
16		31.30	44.40	66.00	96.50	134.00	178.00	222.00
18		34.50	48.90	72.70	106.00	147.00	195.00	244.00
20		37.70	53.20	79.50	115.00	149.00	212.00	265.00

*Example.—A 12-in. header 18 ft. long has 17 branches 4-in. diameter, $195 + 17 × 3.70 = $258. †Includes 1 ft. of pipe with a flange. ‡Includes pipe, two blind flanges, two sets bolts, and three companion flanges.

No. 50 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

10 GOOD REASONS WHY OPERATORS PREFER

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GUN PERFORATOR SERVICE

1. **MEETS EVERY CONDITION.** Guns fired either electrically or mechanically; guns run on cable, sand line, drill pipe, tubing, or on piano-wire measuring line in extremely high-pressure wells.
2. **SIMULTANEOUS FIRING** under all conditions gives exact spacing of shots, perfect perforation pattern, and saves down-the-hole time.
3. **ACCURATE DEPTH MEASUREMENTS** put the shots right where you order them.
4. **MAXIMUM PENETRATION** of bullets into the formation, as proved repeatedly in competitive field tests.
5. **GUNS TO FIT EVERY CONDITION.** McCullough employs more than 30 different types and sizes of guns.
6. **ALL SIZES OF BULLETS** from ⅛" dia. up to ¾" dia., to fit every possible need.
7. **BURRLESS BULLETS,** giving a completely burr-free hole, eliminating casing scraping, with *no* sacrifice of penetration.
8. **NO LOST TIME.** McCullough's simpler, lighter equipment cuts setting-up and moving-out time, speeds up every job.
9. **EXPERIENCED MEN.** With years of experience behind them, thoroughly-trained McCullough gun-perforating crews do their jobs quickly, efficiently, safely.

These Are Some of the Reasons Behind the Proven Fact That

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PUTS THE SHOTS WHERE THEY COUNT.

10 This is a section of a McCullough **90-SHOT GUN** perforating a 15-foot section with 6 holes to the foot, at one run.

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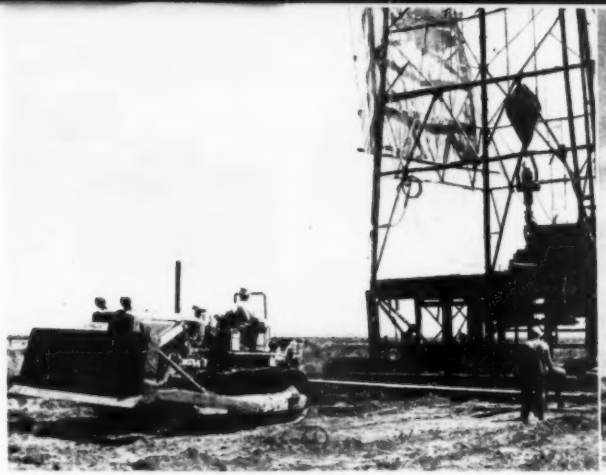
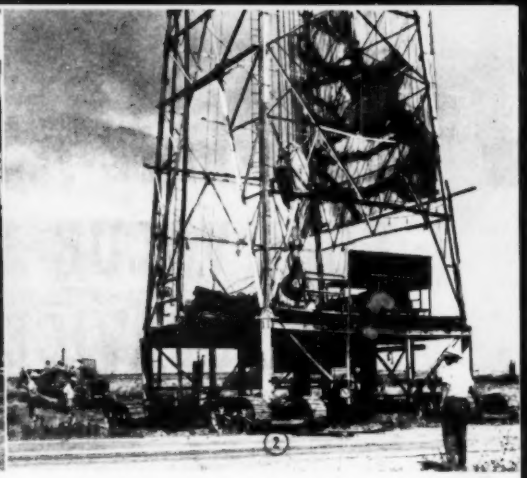


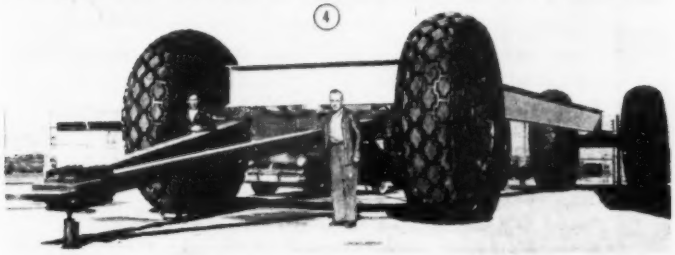


Novel Methods of Rig Moving

1. PERMIAN BASIN RIG MOVING.—This method is assuming a nearly standard character, the track-wheel method shown here being used to a large degree. In this instance it was necessary to cross a railroad, a highway, a telephone line, and a power-transmission line. Preparations are shown here for the crossing of the telephone line, containing 28 wires, which have been lowered to the ground. The same technique was used to cross the power line.

2. ONLY 38 MINUTES FOR MOVE. Planking was again used in the move across Highway 18 between Eunice and Jal, N. M., and to cross railroad tracks nearby. After the telephone and power lines were lowered, the ½-mile location-to-location move was made in 38 minutes after the rig was loaded. Level plains in the West Texas-New Mexico area make this type of rig moving feasible. On some rigs the engine and draw-works platforms are fixed rigidly together and also transported by this method.

3. HORIZONTAL-DERRICK METHOD.—To transport drilling derricks across the deserts of Saudi Arabia Arabian American Oil Co. has devised a huge rubber-tired dolly on which the derrick will be laid for moving between locations. The horizontal position of the derrick on a single vehicle is an especially novel aspect of this unit moving of a rig. The tires which have been specially made for the dolly measure 36 in. through the tires, and the 9½ ft. high. Each tire is capable of carrying a load of 55,200 lb. The frame for the dolly is fabricated from 2-ft. I-beams, and is built in an A-shape. It has two of the large tires at the point of the A, and two each on either leg.



4. A 32-WHEEL TRAILER.—Another feature of Middle Eastern rig moving is the practice of Arabian American Oil Co. of using a single large multiwheeled trailer for the movement of drilling engine and draw-works platforms. These platforms are moved as a unit, it being necessary only to disconnect the drive group from the slush pumps and the draw works from the derrick to rig the unit for moving. The unit shown in the photograph is being moved over the sand of Abqaiq field in Saudi Arabia. Pulling the 32-wheeled trailer is still a difficult job for the tractor, as shown by the tracks.

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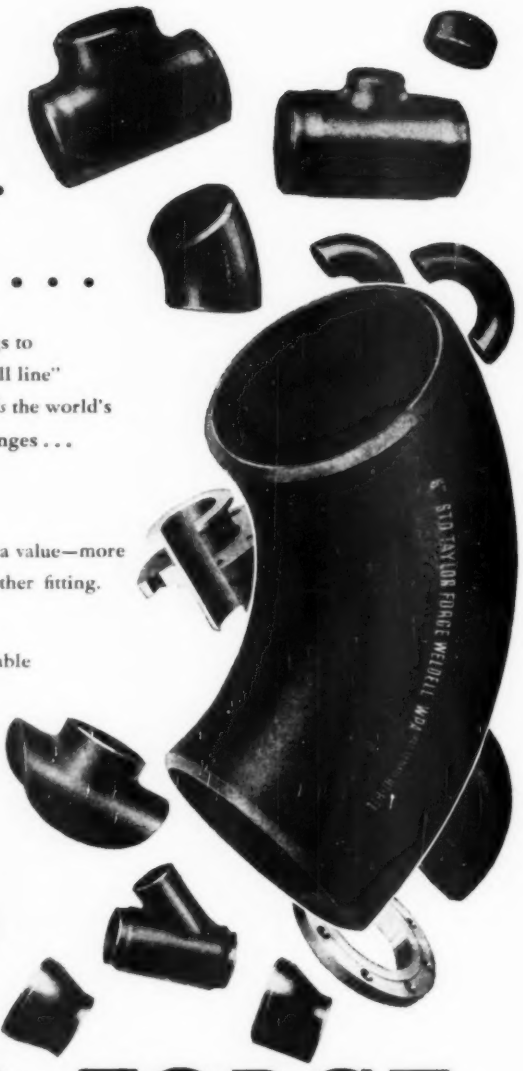

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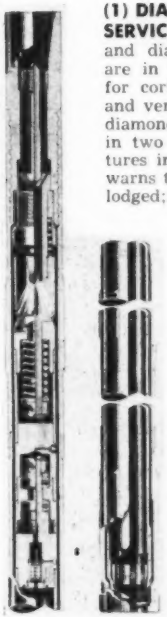
OIL AND GAS EQUIPMENT Digest

IT'S NEW ✓ CHECK IT

by Dan B. Miller



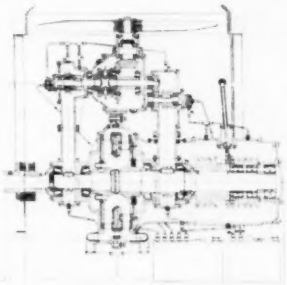
(1) DIAMOND CORING EQUIPMENT AND SERVICE consist of spiral-set diamond bits and diamond core barrels. Spiral-set bits are in two standard cutting-face patterns: for coring in medium abrasive formations and very hard or fractured formations. The diamond core barrel is 50 ft. long, made up in two complete units. Special design features include a signaling mechanism which warns the driller in the event core becomes lodged; a bearing housing containing a floating piston arrangement which maintains consistant equalization of pressure; an extended stringer on the lower inner barrel to minimize washing action on the core; and a new-type core-catcher mechanism which contains no ribs. *Core Laboratories, Inc.*

IT'S NEW ✓ CHECK IT

(2) HIGH HEAD SELF-PRIMING PUMP is a heavy-duty unit, capable of pumping large capacities as well as pumping against high heads, but is unusual in its lightness in weight, which makes it readily portable. It is suitable for a wide range of service such as emergency fire protection; repairs to gas and water mains; pumping out barges, manholes, flooded areas; washing boilers and tanks; pumping through long pipe lines and to high levels and against comparatively high pressures. *Sterling Machinery Corp.*

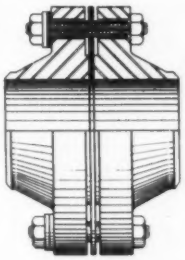
IT'S NEW ✓ CHECK IT

(3) HYDROKINETIC TORQUE CONVERTER. Designed for use with oil-well drilling rigs, the first model is rated at a maximum of 600 hp. at 900 r.p.m. and a minimum of 350 hp. at 800 r.p.m. Future plans call for the torque converter to be built in four additional sizes for the drilling industry: Two high-speed types rated at 130 to 300 hp. at 1,600 r.p.m. and 250 to 575 hp. at 1,600 r.p.m. and two low-speed types rated at 175 to 450 hp. at 900 r.p.m. Outstanding features include extremely high efficiency due to air foil blading; method of mounting turbine and reaction blades which combined with the forward - and - reverse-flow fluid circulating system and automatic cooling system, permitting the torque converter to be used as a brake. Can be used as an automatic weight control and will feed drill bit only as fast as bit can make hole. *Axelson Manufacturing Co.*



IT'S NEW ✓ CHECK IT

(4) PLASTIC FLANGE INSULATION stops the flow of stray and galvanic currents in tubing and flow lines. By using insulation in distribution, transmission, or gathering systems any section of line is effectively isolated from any connecting metallic surface. This electrical isolation makes possible the application of cathodic protection and insures against loss of useful anticorrosion current purposely set up by the installed anode. Flange insulation is jacketed with a thin-walled linen-base plastic sleeve of extremely high dielectric strength and positive moisture resistance. *F. H. Maloney Co.*



IT'S NEW ✓ CHECK IT

(5) WILLIAMS TWO-CONE JET ROCK BIT is for exploration drilling and is available in sizes up to 5 in. Asset of this bit is the added wings which have unobstructed drilled water courses allowing pumped drilling

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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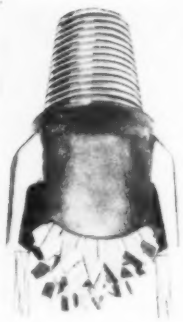
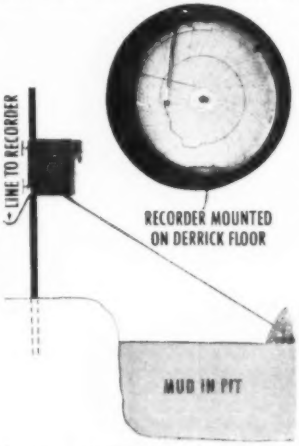


fluid to wash out the cutting directly from the bottom of the hole. The wings act as stabilizers to keep the bit from deviating from its course. Bit has jet action whereby drilling fluid under tremendous pump pressure comes directly against the bottom of the hole breaking and pumping out softer formations and keeping the cuttings washed from harder formation so that the cutting teeth will always be digging on original formation. *Oil Tool Manufacturing Co.*

IT'S NEW CHECK IT

(6) AUTOMATIC PIT-LEVEL INDICATOR AND ALARM SYSTEM. The instrument warns the driller instantly of changes in the level of the fluid in the pit. Should the well begin to unload, the level of the fluid in the pit rises and causes the instrument to sound the alarm. Should the formations begin taking an abnormal quantity of drilling fluid, diminishing the mud returns and causing level of pit to lower, the alarm would also sound. Instrument will measure 1-in. variations in the pit level and the alarm system can be set to ring the electric bell when the pit level rises or falls any predetermined measure. Maximum range is 3 ft. above or below the normal level. *Petroleum Instrument Co.*

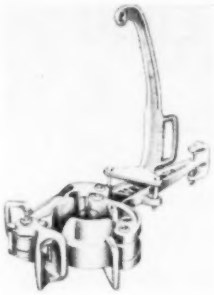


IT'S NEW CHECK IT

(7) DEMCO FLEXIBLE COUPLINGS are recommended for all general-purpose applications. They effectively withstand shock, vibration, and normal amounts of misalignment, and are unaffected by dirt, moisture, abrasive materials, and oils. No lubrication is required throughout the life of the couplings. Air circulates freely throughout the coupling. Couplings are so constructed that flexibility is accomplished entirely without the use of any flexible parts. While the driving pins are resilient, the over-all flexibility is in no way dependent upon flexible parts. *Diesel Engineering & Manufacturing Corp.*

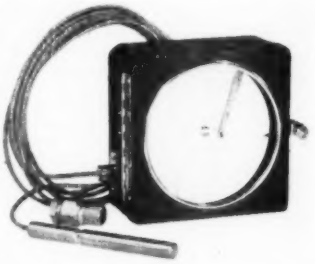
IT'S NEW CHECK IT

(8) NEW LIGHTWEIGHT TYPE D TONG. This tong was designed to fulfill the needs of manufacturers and operators of portable-mast rigs for shot-hole and geophysical operations. It features the spiral hinge-pin arrangement which assures an equalized pressure against the drill pipe from all three jaws and equalizes the loading stresses on the hinge pins and jaws so as to minimize breakage of these parts. Size range of the tong is changed by replacing the lug jaw. Size ranges of the individual lug jaws are as follows: $2\frac{3}{8}$ to $3\frac{1}{8}$ in., $2\frac{7}{8}$ to $4\frac{1}{8}$ in., 4 to $5\frac{1}{4}$ in., and $5\frac{1}{4}$ to $6\frac{1}{4}$ in. *Wilson Oil Tools, Inc.*



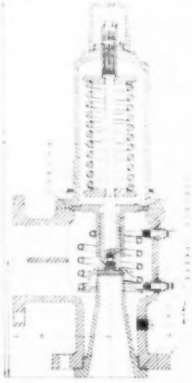
IT'S NEW CHECK IT

(9) MINICORDER TEMPERATURE, is a distant reading recording thermometer. Type 2 is gas actuated and has uniform scale divisions; Type 2-A is vapor actuated and has increasing scale divisions for the greatest sensitivity over a limited range. These instruments weigh $2\frac{1}{2}$ lb. and are enclosed in a cast aluminum case $5\frac{1}{4}$ by $5\frac{1}{4}$ by $2\frac{1}{4}$ in. finished in crystal black. The case is fully rubber gasketed for protection. The measuring element is a spiral Bourdon tube calibrated in Type 2 for various ranges from —100° F. to as high as 1,000° F. and in Type 2-A for ranges from —30° F. to as high as 400° F. Clocks are either spring wound or synchronous electric. *Dickson Co.*



IT'S NEW CHECK IT

(10) INTERNAL HEAT EXCHANGER FOR SAFETY AND RELIEF VALVES. New efficiency in the operation of safety and relief valves handling viscous materials is made possible by any internal heat exchanger. Heater is a steam coil built into a valve body around the seat and guide. The design is such that heat is provided where it most effectively keeps highly viscous materials in a fluid state. The need for costly and inefficient steam tracing is eliminated. *Farris Engineering Corp.*



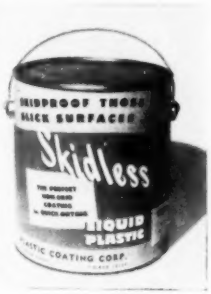
IT'S NEW CHECK IT

(11) ROXCO. New patterns, dies, and metallurgical formula have combined to produce a heavy-duty, modern pipe wrench. This new wrench has only four parts, and although light in weight, it exceeds federal specifi-

cations for Type II heavy-duty wrenches. Made in all sizes, 6 to 24 in. *Trimont Manufacturing Co.*

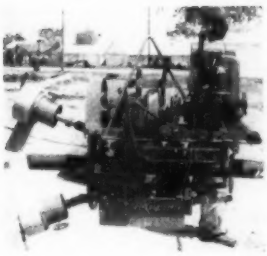
IT'S NEW CHECK IT

(12) SKIDLESS. A new protective coating material for skidproofing surfaces made dangerous because of slickness. Is impervious to practically all petroleum products, and can be applied to metal, wood, cement, or canvas. This coating offers a naturally durable finish, and by the use of abrasives which bond to the surface, gives a positive footing. It may be readily applied by brush and is extremely quick drying. Available in both quarts and gallons and in abrasives of either fine or coarse type. A range of colors is available. *Plastic Coating Corp.*



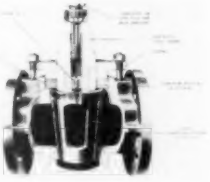
IT'S NEW CHECK IT

(13) LINE TRAVELING COATING AND WRAPPING MACHINE. New traveling-type pipe-coating and wrapping machine. This unit is now being manufactured in a variety of models for coating and wrapping pipe from 2 to 36 in. in diameter. Machine utilizes a spray ring for applying the coating. This makes it possible to coat and wrap pipe that is bent or "egged" or "out of round," and assures a uniform coating. This principle is of great value particularly when coating large-diameter thin-wall pipe. *M. J. Crose Manufacturing Co.*



IT'S NEW CHECK IT

(14) CORROSION-RESISTING PLUG VALVE. A new valve embodying the general design principles of the Durco top lubricated plug valve, but with many new features is produced in sizes through 3 in. New features are: The plug proper is made of a hard corrosion-resisting alloy; shank is made of stainless steel permanently bonded into the plug. The body and gland are made of Duriment 20, providing ample strength and excellent corrosion resistance. The packing for the stuffing box consists of a combination of corrosion resisting hard and resilient packing rings and a Teflon antifriction packing seal. *Duriron Co., Inc.*

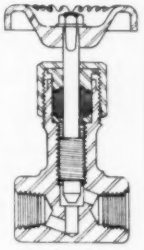


IT'S NEW CHECK IT

(15) GUIDE-ANCHOR-GUIDE. A new simplified, standardized method for guiding and anchoring the expansion joint on long rigid members, insures complete alignment of working parts at and around the expansion joint. It makes unnecessary the figuring of anchor thrusts and the detailed, complicated attachments between pipe and structure. Anchor-Guide takes up the increased length of pipe, occasioned by temperature changes in the gases or liquids conveyed by the piping system. The anchor and guide connections are prefabricated to fit and are welded to the pipe in the field. It can be modified to accommodate angular changes in the run of the pipe. *Piping Specialties, Inc.*

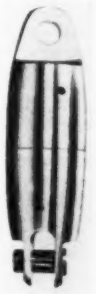
IT'S NEW CHECK IT

(16) HIGH-PRESSURE NEEDLE VALVES feature one-piece, forged bodies which entirely eliminate leakage. These valves have tapered point needles for closer flow control and leakproof seating. The valve stem is hard chrome plated for maximum service life. They are designed for control of air, fluids, and gases under pressures up to 3,000 psi. Three types are offered: globe, angle, and tee, in $\frac{1}{8}$ and $\frac{1}{4}$-in. pipe sizes. Each type is manufactured in three materials: brass, steel, and stainless steel. *C. A. Norgren Co.*



IT'S NEW CHECK IT

(17) NEW ROPE SWIVEL. A new type of wire-rope swivel that has double roller bearings and will swivel under full load is being offered for all rope applications. Some of the features of these swivels are: both thrust and radial roller bearings; completely streamlined bodies; heavy load capacity in relation to size; permanent lubrication; replaceable parts. These swivels are offered in five sizes: for $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1, and $1\frac{1}{2}$-in. wire-rope sizes. They can be had with four types of ends: eye-bolt, hook-bolt, integral eye, or clevis. *Flexo Machines Co.*



TRADE LITERATURE

(18) CORROSION RESISTANCE OF STAINLESS, MONEL, AND NICKEL CASTINGS, a new bulletin on corrosion resistance of stainless, monel, and nickel castings containing comprehensive data sheet was designed to aid materials engineers in their selection of the best alloy. *Cooper Alloy Foundry Co.*

(19) 1949-1950 GENERAL CATALOG. This catalog contains illustrations and descriptions of the entire line

of Larkin cementing and production equipment. *Larkin Packer Co., Inc.*

(20) INFRARED GAS ANALYZER describes an automatic, recording, gas analyzer, which utilizes the infrared-absorption characteristics of gases to obtain continuous determination of the critical component in a gaseous stream. *Baird Associates, Inc.*

(21) MICROVAC PUMPS FOR HIGH VACUUM. A 36-page, 3-color catalog and data book for the engineer, research man, works manager, and purchasing agent describes the complete line of pumps, including specifications, and their applications in research and industry. Valuable vacuum data and engineering information are given, together with actual vacuum processing problems for many industries. *F. J. Stokes Machine Co.*

(22) CATALOG NUMBER 50 contains photographs and complete description of fittings with list prices and weights. *Union Malleable Manufacturing Co.*

(23) ITS CATERPILLAR ALL THE WAY. Clearing, ditching, stringing, stabbing, wrapping, laying-in, and backfilling operations on pipe-line projects are pictorially presented in a 12-page booklet. *Caterpillar Tractor Co.*

(24) CROSSLEY PRODUCTIONS is a 22-page book giving complete engineering data, along with descriptions and illustrations of this line of diesel, gas, and gasoline engines, compressor sets, generator sets, and pump sets, ranging from single cylinder, 3½ hp. to above 1,000 b.hp. *Crossley Brothers, Ltd.*

(25) PRESSURE GAGES offers pressure, weight, and hydraulic ram conversion tables in addition to complete descriptions and illustrations of gages designed for a wide variety of uses. *Marshalltown Manufacturing Co.*

(26) BULLETIN 208 describes electrolytic motor generators, diverter-pole motor generators, frequency changers, industrial dynamometers, sychronous motors and generators, large induction motors, and slip-ring motors. *Electric Products Co.*

(27) KYSOR PROTECTOSTAT describes a positive protection system for stationary engines that shuts off the fuel and automatically declutches the engine when overheating or low oil pressure is encountered. *Kysor Heater Co.*

(28) SUSPENDED ENCLOSURES APPLIED TO OIL-REFINERY FURNACES. This well prepared book carries an engineer's drawing, specification sheet, and description of features of enclosure for majority of heater applications found in processing plants. *Bigelow-Liptak Corp.*

(29) CENTRALIZER TEST DATA is a four-page brochure presenting technical data on centralizers as a guide to proper selection for the job. *Weatherford Oil Tool Co., Inc.*

(30) BALANCE YOUR PRODUCT. This six-page, two-color brochure describes equipment for balancing accurately and quickly, products for virtually any industrial application. There is also a formula by which magnitude of the force causing vibration can be calculated. *Taylor Dynamometer & Machine Co.*

(31) RIGHT-ANGLE TURBINE PUMP DRIVE, an eight-page specification booklet includes shallow well and low head installations, a cutaway illustration of the drive, engineer's drawings of several applications, and extensive specification information. *Johnson Gear & Manufacturing Co., Ltd.*

(32) SQUIER LUBRICATORS gives complete construction and operating details, field performance data, and locations of these lubricators now in actual service. Of particular interest is information on new low-pressure automatic orifice-meter bearing-shaft lubricator. *John P. Squier Co.*

(33) POWER AND HAND HOISTS is a series of specification sheets including performance charts, descriptions, illustrations, prices, weights, and dimensions. *Beebe Bros.*

(34) METERS AND CONTROL SYSTEMS. This 12-page folder describes control systems and meters for boilers, combustion control, feed-water control, steam-temperature control, desuperheating and pressure reducing control, condensate flow control, control for boiler feed pumps, safety devices, and process control. *Bailey Meter Co.*

(35) FLOAT VALVES AND BOXES, is a new illustrated bulletin on the No. 14 single seat and No. 15 balanced float valves and No. 20 float boxes with control valve. *O. C. Keckley Co.*

(36) ENGELHARD CO_2 ANALYZER is a four-page illustrated bulletin, which stresses the importance of efficient furnace combustion and describes the practical, simple way the CO_2 Analyzer measures CO_2 content of the flue gases to help keep the air supply at an optimum level. *Charles Engelhard, Inc.*

(37) 20,000 FEET AND THEN SOME. A 24-page illustrated book describes the well-head assembly used on the world's deepest well. The book contains complete engineering specifications and details of the C-19 casing-head with recommended well-head assemblies for deep, high-pressure wells. *Oil Center Tool Co.*

(38) PORTABLE BRIDGING, ROADWAY MATERIALS. A new 28-page, fully illustrated report is offered to acquaint the oil, gas, pipe-line, and construction industries with the variety of possible uses of several basic materials and methods now available on a rental basis for constructing temporary bridges, barges, and roadways. *Portable Bridge & Equipment Co.*

(39) GAS LIFT EQUIPMENT, a new 36-page catalog describes the complete line of bellows-pressure Monel-spring operated flow valves in detail, differential flow valves, reverse check valves, tubing mandrels, and the intermitter, the type A time cycle controller. *Camco, Inc.*

IT'S NEW ✓ CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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This MP Duraflex Pump is proving a sensational success. Its pliant, double rotors of amazing Dupont Neoprene give efficiency never before possible.

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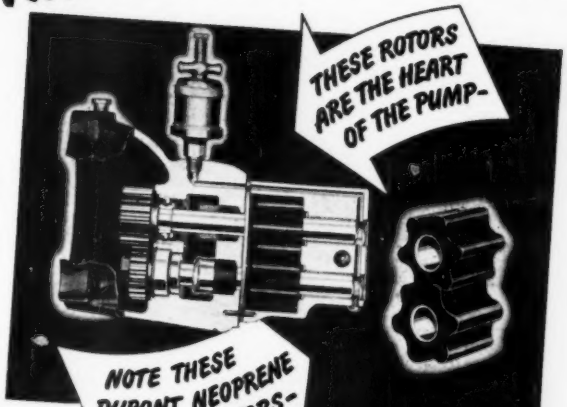
Capacity, 40 GPM Maximum. Develops 150 lbs. pressure. Speed range from 300 to 3200 RPM. 1 1/2" Pipe Size.



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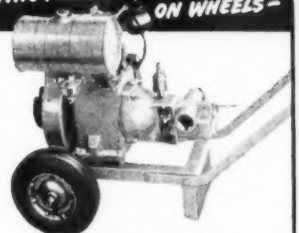
The complete MP Duraflex story is given in these booklets; specifications, data that will help you cut pump costs. Send for them today.

WHERE POWER IS NOT AVAILABLE-

Standard Duraflex 6600, driven by Heavy Duty 5 H.P. Wisconsin gas engine. Throttle lever for speed adjustment. Built-in governor. Weight, 110 lbs. gives easy portability. Height, 20 1/4" Width, 22 5/8".

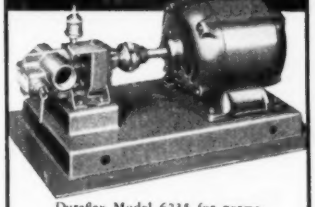
AVAILABLE AT MOST LEADING SUPPLY STORES

THIS PORTABLE GAS MODEL ON WHEELS-



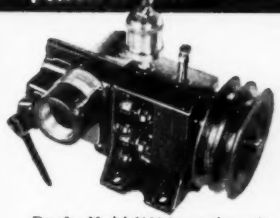
Portable Model Duraflex 6693 for extreme one-man portability. Zero pressure pneumatic tires mounted on ball bearing wheels. Extra heavy duty steel frame with direct connected heavy duty 5 H.P. Wisconsin Motor.

WHERE ELECTRICITY IS USED-



Duraflex Model 6235 for permanent applications requiring independent electric power. 2 HP Electric Motor, 1750 RPM, provides 18 Gallons per minute at 100 lbs. pressure. Entire unit assembled and aligned on heavy welded steel base.

WHERE SOURCE OF POWER IS AVAILABLE-



Duraflex Model 6200 is complete unit for belt drive from main power source. Companion Heavy Duty Package Clutch Model 4400 available which permits periodic pumping without stopping and starting main engine.

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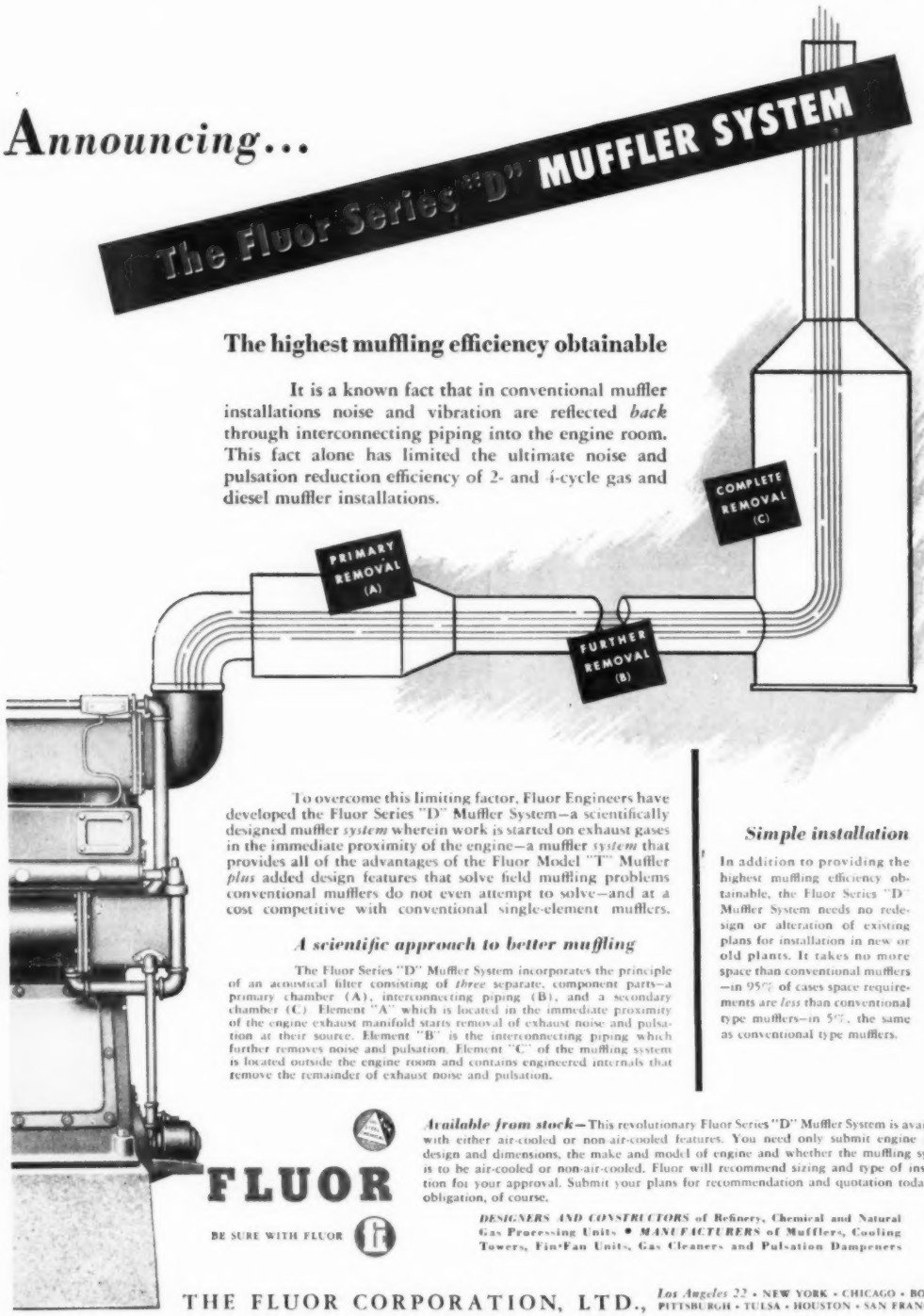
Announcing...

The Fluor Series "D" MUFFLER SYSTEM

The highest muffling efficiency obtainable

It is a known fact that in conventional muffler installations noise and vibration are reflected *back* through interconnecting piping into the engine room. This fact alone has limited the ultimate noise and pulsation reduction efficiency of 2- and 4-cycle gas and diesel muffler installations.



To overcome this limiting factor, Fluor Engineers have developed the Fluor Series "D" Muffler System—a scientifically designed muffler *system* wherein work is started on exhaust gases in the immediate proximity of the engine—a muffler *system* that provides all of the advantages of the Fluor Model "T" Muffler *plus* added design features that solve field muffling problems conventional mufflers do not even attempt to solve—and at a cost competitive with conventional single-element mufflers.

A scientific approach to better muffling

The Fluor Series "D" Muffler System incorporates the principle of an acoustical filter consisting of *three* separate, component parts—a primary chamber (A), interconnecting piping (B), and a secondary chamber (C). Element "A" which is located in the immediate proximity of the engine exhaust manifold starts removal of exhaust noise and pulsation at their source. Element "B" is the interconnecting piping which further removes noise and pulsation. Element "C" of the muffling system is located outside the engine room and contains engineered internals that remove the remainder of exhaust noise and pulsation.

Simple installation

In addition to providing the highest muffling efficiency obtainable, the Fluor Series "D" Muffler System needs no redesign or alteration of existing plans for installation in new or old plants. It takes no more space than conventional mufflers—in 95% of cases space requirements are *less* than conventional type mufflers—in 5%, the same as conventional type mufflers.

Available from stock—This revolutionary Fluor Series "D" Muffler System is available with either air-cooled or non-air-cooled features. You need only submit engine room design and dimensions, the make and model of engine and whether the muffling system is to be air-cooled or non-air-cooled. Fluor will recommend sizing and type of installation for your approval. Submit your plans for recommendation and quotation today—no obligation, of course.

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DESIGNERS AND CONSTRUCTORS of Refinery, Chemical and Natural Gas Processing Units • ***MANUFACTURERS*** of Mufflers, Cooling Towers, Fin-Fan Units, Gas Cleaners and Pulsation Dampeners

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REFINING

Pan-Am Southern Completes Refinery-Expansion Plans

Extensive plans covering an expansion program at Pan-Am Southern Corp.'s El Dorado, Ark., refinery were announced last week by R. T. Colquette, general manager of the refinery.

New facilities, including a 9,300-bbl.-per-day delayed-coking unit, will be constructed and are expected to be in operation by September 1950. Lummus Co. has been selected as the engineering contractor for the new coking unit.

Colquette said that the new coking facilities and associated auxiliaries will provide the much-needed flexibility in the El Dorado refinery operation to meet increased requirements of gasoline and distillate fuels and to reduce yields of residual oils.

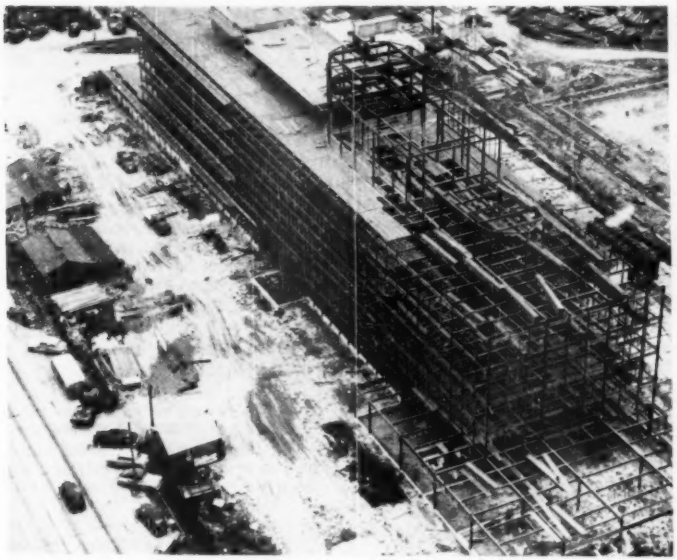
The new coking unit will include two vertical coke drums 17 ft., 6 in. in diameter, and 80 ft. high. It is believed that these drums will be the largest-size vertical coke drums ever installed on a delayed-coking unit, Colquette said. Hydraulic decoking will be employed. The two drums will operate on a 48-hour cycle, producing approximately 420 tons daily of coke. The coke produced will represent approximately 27 per cent of the 12 -gravity reduced crude charged to the unit. Also, the unit will produce 1,900 bbl. a day of gasoline and 5,230 bbl. daily of gas oil suitable for conversion to high-octane gasoline in the catalytic cracking unit.

In addition to the delayed-coking unit, the refinery utility facilities will be enlarged, the additions including a new steam-generating boiler, a water-cooling tower, and coke handling and loading facilities.

Pan-Am Southern Corp.'s 25,000-bbl.-per-day El Dorado refinery was formerly the Root Petroleum Co. refinery. As announced on September 1 Root Petroleum Co. was merged with its parent, Pan American Petroleum Corp., to form Pan-Am Southern Corp.

Two Texas Refineries Hit By Explosions and Fire

Two Texas refineries were hit by explosions and fires last week which killed 2 persons, injured 15 others,



Construction work at Esso Standard Oil Co.'s Baton Rouge refinery includes this new 5-story office building and a new cafeteria, which will cost in excess of $4,000,000. Steel framework for the office building has already been erected and the foundation poured for the cafeteria. Work on the two structures, which will be completely air-conditioned, is expected to be completed next summer. Photo, by Rotkin, courtesy Standard Oil Co. (N. J.)

PENBERTHY
"TRANSPARENT"
DROP FORGED STEEL
LIQUID LEVEL GAGES

Used to observe color and density of liquids under high pressures and/or temperatures. Construction exceptionally sturdy. Made of alloy temperature resisting steel, and are highest quality throughout. Liquid chamber made from solid block of steel to assure perfect alignment and rigidity. Conform with A.P.I.—A.S.M.E. requirements.

The "Transparent" is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

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LININGS FOR
BUBBLE TOWERS • SETTLERS • STILLS • SEPARATORS • TANKS • AND VESSELS OF ALL TYPES • ENCASING AND FIREPROOFING STRUCTURAL STEEL AND PIPE • LINING WATER RESERVOIRS, DITCHES, DRAINS, AND CANALS • REPAIRING DISINTEGRATED CONCRETE AND OTHER MASONRY.
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and seriously damaged installations.

An explosion and fire resulted in two deaths at Magnolia Petroleum Co.'s Fort Worth refinery No. 1, when the conflagration began in a combination cracking unit at the plant. No damage estimate was given.

Phillips Petroleum Co.'s Rice gasoline plant near the company's refinery at Borger, Tex., suffered an explosion and fire which injured six persons. Fire was believed to have begun in the catalytic units.

Ohio Oil Co.'s Lovell Refinery Given Award

The Lovell, Wyo., refinery of Ohio Oil Co. was recently given the U. S. Bureau of Mines' Joseph A. Holmes Safety Association Certificate, for operating without a lost-time accident from November 25, 1938, to January 1, 1947, for a total of 750,000 man-hours.

In ceremonies held at the plant, J. C. Donnell, II, president of Ohio Oil, presented the certificate to Bert B. Miller, refinery superintendent.

Montreal East Construction To Raise Plant Output

Initial construction is under way at the Montreal East refinery of Shell Oil Co. of Canada, Ltd., which will result in complete modernization and an 80 per cent increase in crude-charging capacity.

New units being added include a 12,000-bbl. per day vacuum distillation unit which will produce a 60 per cent distillate overhead from reduced crude charge. Two existing crude units at the plant are being revamped to conform to the proposed new operations. When completed late next year, the crude units will handle 25,000 bbl. daily.

A 10,000-bbl. per day modified U.O.P. fluid catalytic cracking unit complete with light-ends recovery and polymerization facilities, is also under construction, and existing Dubbs cracking facilities will be revamped to fit the new program. New phosphate and caustic-treating units are being added and a 7,000-bbl. per day solutizer unit is expected to be in operation early next year.

New boiler capacity and sour-water treating facilities are also under way. The refinery now has a new control and development laboratory building.

Of the new construction now under way, Arthur G. McKee & Co. has contracts for the fluid catalytic cracking unit, the vacuum unit, and light-ends recovery facilities. Fluor Corp. is handling auxiliary facilities and revamping work on existing units. The solutizer job is being handled by Shell personnel. Completion of the entire project is expected in late 1950.

British American to Add to Clarkson, Ont., Refinery

British American Oil Co., Ltd., has announced closing of a contract with Canadian Kellogg Co., Ltd., for engineering, design, procurement, and construction of a 700-bbl. per day propane deasphalting unit at its Clarkson, Ont., refinery. Construction will commence later this year and initial operation is slated for mid-1950.

The new unit will be operated in conjunction with existing M.E.K., furfural refining, and clay-contact facilities for manufacture of bright stocks. The Clarkson refinery, processing Illinois crudes, has a capacity for production of 1,000 bbl. of finished lubricants daily.

10-Week Strike at Crown Central Refinery Is Over

A 10-week shutdown due to labor difficulties at Crown Central Petroleum Corp.'s refinery at Pasadena, Tex., came to an end last week when union workers ratified a new working contract.

Approximately 350 members of Oil Workers International Union (C.I.O.) approved an agreement reached by company officials and a union arbitration committee. The plant was shut down July 7 after workers began a sitdown strike to write out their grievances.

THOMAS Flexible COUPLINGS
ALL METAL
SPECIFIED WHEREVER 100% DEPENDABILITY IS DEMANDED

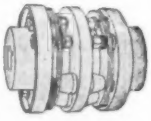
Refiners specify Thomas "Flexible" Couplings for PUMPS, COMPRESSORS, COAL PULVERIZERS, COOLING TOWERS and GENERATOR SETS.

TYPE DBZ-C

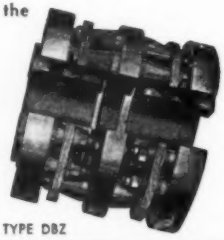
Pipe Line Men know that Thomas "Flexible" Couplings on their Low or High Speed Pumps give 100% dependable service.

TYPE CM

Drilling Engineers get the most out of their equipment with Thomas "Flexible" Couplings on Engine, Gear and Mud Pump Drives.


TYPE DBZ-B

In the Laboratory Thomas "Flexible" Dynamometer Couplings assure the greatest accuracy.


TYPE DBZ

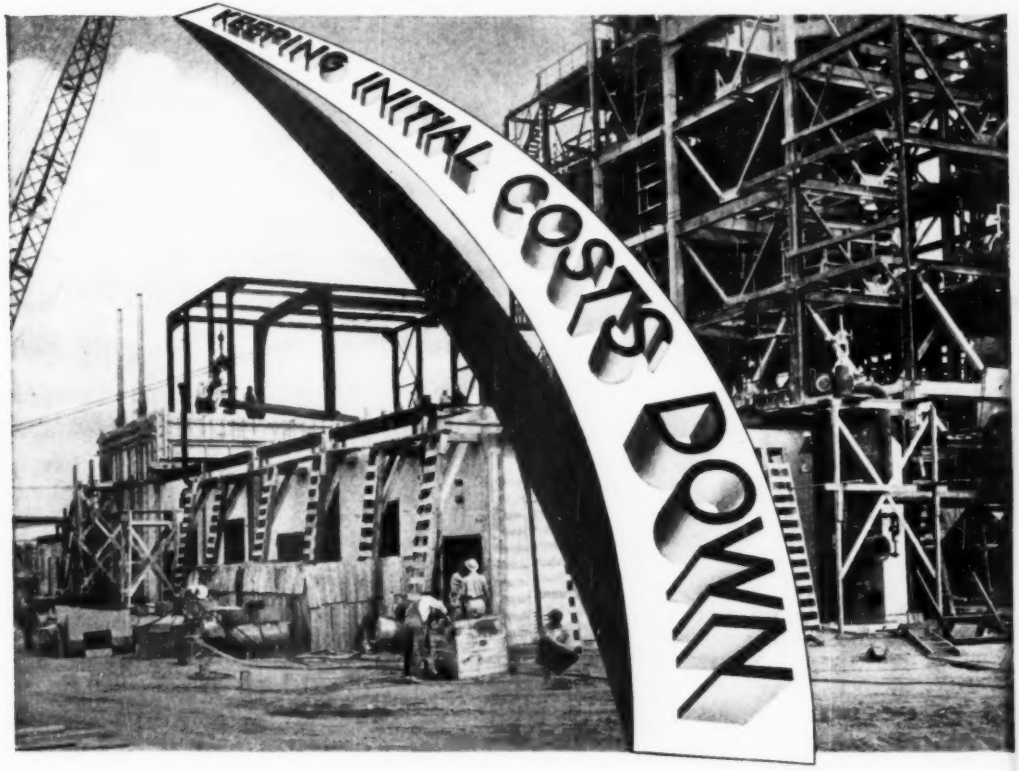
Thomas Flexible All-Metal Couplings Have No Wearing Parts.
BACKLASH, FRICTION and CROSS-PULL ARE ELIMINATED.

NO LUBRICATION IS REQUIRED!

Write for the new Engineering Catalog

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

N.B. While it is axiomatic that return on investment—the *ultimate earning* power of a refinery unit when actually on stream—is the only true evaluation of competitive engineering recommendations, initial plant costs remain a major factor in refiners' decisions on plant installations. M. W. Kellogg takes specific steps to *minimize initial plant costs* consistent with the achievement of *highest ultimate earning power*.



NOW—PRE-CAST WALLS THAT SAVE OVER 35%

Nearly everyone is familiar with the astronomical heights to which the costs of brick refinery buildings have risen. Some efforts have already been made to find lower costs methods. Among these is the use of concrete blocks, but this type of construction has the decided disadvantage of low structural strength to support equipment. Poured concrete walls remedy this defect but again prices soar because of tailor-made form work.

Seeking an economical solution to this problem, Kellogg's engineering and construction departments combined their efforts. They eventually arrived at a design that not only overcomes such disadvantages as low structural strength, but *saves upwards of 35% of the cost of brick buildings*. Moreover this new technique has a further advantage in that the buildings can be closed in a fraction of the time required for other types, thus permitting interior work to proceed regardless of weather.

Kellogg's concept isn't unusual, but the application is. Several recently completed large steel frame buildings and reinforced concrete super-structures were designed so that entire wall sections could be precast—*complete* with all door and window frames as well as conduit, duct and pipe inlets in place. Poured at the same time as the foundations, wall sections cure simultaneously and cranes can then lift them into position in a matter of minutes. The result: Modern, industrial housing with low maintenance and high functional value at radically lower costs.

This is another example of how completeness of staff and integration of operation benefit the refiner. Such attributes are the result of size, and of wide experience in both technical and managements phases. The M. W. Kellogg Company believes that such an organization is the only true approach to LOW INITIAL COSTS.

THE M. W. KELLOGG COMPANY

A SUBSIDIARY OF PULLMAN, INC.

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THIS VALVE OPERATES

3 to 10 times as long

WITHOUT ATTENTION

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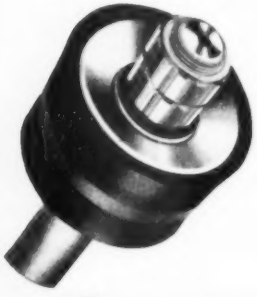
The Bushing and long-lived insert are the reasons

MISSION Slush Pump Pistons give longer trouble-free service



"3 to 10 times as long, without attention!" Can so strong a claim be true?

The figures are confirmed by hundreds of field records. The MISSION "Compound 308" Insert lasts 3 to 5 times as long as regular inserts in ordinary mud, and up to 10 times as long as ordinary oil-resisting inserts in hot, chemically treated or oil-base mud.

The MISSION Replaceable Valve Seat Bushing works hand in glove with the insert to avoid interruptions of drilling. The life of the bushing, which protects the seat from wear, approximately equals that of the insert. When you install a new insert, install a new bushing. This gives you practically a new valve, which should again require servicing only when the insert again wears out.

The MISSION Valve has extra-large sealing surface and ample fluid passage, and operates with top efficiency. It handles with ease even the most difficult muds, including oil-base muds and those containing cotton seed hulls, abrasives, etc. It is guaranteed to prove more economical than others, or money refunded.

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PIPE LINES

Great Lakes Awards New Pipe-Line Contract

Great Lakes Pipe Line Co. has awarded contracts for laying six sections totaling 261 miles of 12-in. to parallel existing twin 6-in. lines between Des Moines and Minneapolis. The company is planning immediate expenditure of $37,500,000 in an expansion program.

Contracts, from south to north, are as follows: O. R. Burden Construction Co., 65 miles north from Des Moines; A. C. Holder Construction Co., 72 miles to Iowa-Minnesota state line; Sheehan Pipe Line Construction Co., 104 miles, Albert Lea to St. Paul, Minn.; Williams Brothers Corp., 20 miles, Mississippi River crossing and line to terminal and station.

If pipe deliveries are on time, work will start in the week of October 10. Pipe will be coated. The two lines at the river crossing will be ballasted with clamps.

Work Under Way on New Mid-Valley Pipe Line

For the laying of the Mid-Valley Pipe Line Co. (Sun and Sohio) 1,000-mile project from Longview, Tex., to Lima, Ohio, Latex Construction Co. is engaged in Louisiana and Arkansas operations.

The 22-mile, 8-in. and 12-mile, 6-in. laterals for the project in the Haynesville, La.-Stephens, Ark., area are being built under supervision of O. R. Mitchell, spread superintendent with headquarters at Magnolia, Ark.

The 41-mile, 12-in. lateral from the Delhi, area to Lake Providence, La., has been scheduled for construction based at Lake Providence.

Mississippi River Crossings consisting of two 20-in. lines, to be laid north of Lake Providence, are under supervision of J. A. Cantrell, superintendent. Work starts this week.

Preliminary operations have been under way this month for laying 120 miles of 20-in. from Haynesville to Lake Providence, La.

Cities Service Line Completed to Kansas City

Completion of the 400-mile natural-gas pipe line from the Kansas-Hugoton field to Kansas City was announced today by S. B. Irelan, president of Cities Service Gas Co.

The $30,000,000 pipe-line project will be put into service officially on October 12. Governor Frank Carlson of Kansas will open a gate valve in dedication ceremonies at the company's South Glavin Regulation Station, near Lenexa. Other chief executives invited to attend the ceremony include Governors Roy J. Turner of Oklahoma, Forrest Smith of Missouri, Allen Shivers of Texas, and Val Peterson of Nebraska.

At full capacity the line will deliver 270,000,000 cu. ft. of gas daily. It was designed to operate at a maximum pressure of 900 psi. So far, 400,000 acres in the nation's largest producing gas field has been set aside to supply the new line.

Construction Progressing On P. G. & E. Gas Line

Right-of-way for the 80-mile northern stretch of Pacific Gas & Electric Co.'s 510-mile, 30-34-in. natural-gas pipe-line project is cleared, with the exception of that portion through the orchard section near San Jose, Calif., and construction work is progressing about 1 mile per day, according to Bechtel Corp., contractors.

About 30 miles of pipe is already laid, beginning at Llanda to the point where work is under way in the vicinity of Hollister, Calif. Pipe is being distributed along the right-of-way about 5 miles in advance of crews.

Location of the crew last week, working on ditching, bending, assembling, wrapping, and let-down, was in the vicinity of Tres Pinos.

In the area of intensively cultivated land near San Jose crews will follow the laying of the line and restore the land and properties of local residents along the right-of-way to their original condition. Every precaution is being taken to prevent extensive damage to the trees and land, making it an extraordinarily difficult and unique pipe-line problem.

Weston County, Wyoming Crude Line Is Completed

Plains Pipe Line Co. was tying in last week with Rocky Mountain Pipe Line Co.'s Lance Creek, Wyo., station, thus completing its outlet from the Musk Creek - Fiddler Creek - Skull Creek fields of Weston County, Wyoming.

The line's completion is considered of vital importance to future market-

CRC
PIPE LINE CONSTRUCTION EQUIPMENT
CRUTCHER-ROLFS-CUMMINGS, INC.
Pipe Line Equipment and Materials
Houston - Tulsa

418 MILES
By One Spread in One Year
One pipeline spread of Latex Construction Company laid and took-up 418 miles of pipe during our fiscal year ending Nov. 30, 1948 . . . demonstrating the value of combining years of experience and specialization with a well integrated organization for more efficient pipeline construction.
The mileage of pipeline work done by this one spread was divided as follows:
Miles of Pipe laid, 16" and larger 306
Miles of Pipe laid, 8", 10" and 12" . . . 62
Miles of Pipe taken-up and reconditioned . . 50
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General Contractors
Oil-Gas-Gasoline-Water Pipelines
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Cut & Bevel Any Pipe With
Maximum SPEED
Minimum COST

The H & M PIPE CUTTING and BEVELING MACHINE for 2 to 36-in. pipe

SPEED: Complete cut and bevel can be made on 12 inch pipe in about 2 minutes.
ECONOMY: Save approximately one-half labor and gas costs.
PORTABILITY: Can easily be carried from one pipe section to another.
Write for Literature and new, lower prices. Cut Of Rounds attachment fits all machines

The H & M
Pipe Beveling Machine Co.
311 East Third Street, Tulsa, Oklahoma

ing of oil from these areas. The 8-in. line has a daily capacity of 20,000 bbl.

Production in the area is estimated at 6,000 bbl. daily, with 6,000 bbl. shut in without market.

Stanolind Oil & Gas Co. Lays Fullerton Lines

With the completion this month of 82 miles of natural-gas lines in the Fullerton, Tex., area for Stanolind Oil & Gas Co., the contractor, Deaton & Sons, Inc., finished a program totaling 371 miles contracted for this company.

The work completed in September consists of 63 miles for a gathering system of 2 to 26-in. diameter in the Fullerton field and 19 miles of 4-in. and 6-in. pipe laid from the Fullerton field to Eunice, N. M.

Other work for the company completed earlier this year includes the following: 132 miles, 4-30-in., gas line in the Hugoton field, Kansas; 130 miles, 2-30-in., gas lines Levelland area, Tex.; 23 miles, 3-10-in. water line, Fullerton area, Tex., and 4 miles, 4-6-30-in. gas lines in the North Cowden field.

Atlantic Seaboard Project Is Nearing Completion

The 262-mile, 26-in. Clendenin, W. Va.-Rockville, Md., project of Atlantic Seaboard Corp. and Virginia Gas Transmission Co. (Columbia Gas System, Inc., subsidiaries) is approaching completion.

In constructing 206 miles for this undertaking, H. C. Price Co. has been operating in three sections: Cleveland-Seneca, W. Va., 68 miles; Seneca-Strasburg, W. Va., 70 miles; Strasburg-Rockville, Md., in the Baltimore area, 68 miles. The remainder of the project was contracted by Ray L. Smith & Son, Inc.

Projects completed earlier this year by H. C. Price Co. include two lines for Tennessee Gas Transmission Co., one of which was for 50 miles of 30-in. from Greenville to Rulville, Miss.

River-Crossing Contracts Let by Arkansas Louisiana

Arkansas Louisiana Gas Co., which let contracts for its newly authorized 163-mile, 20-in. natural-gas pipe line from the Waskom field in East Texas to the Perla reducing station at Perla, Ark., announced that three river crossings will be made as follows:

At the Red River, approximately 30 miles north of Shreveport, contracted to Omaha Dredge & Dock Co., Omaha; under the Ouachita River 5 miles south of Arkadelphia, Ark., also contracted to Omaha Dredge & Dock; and under the Little Missouri River, 7 miles northeast of Prescott, Ark., a multiple 14-in. crossing, contracted to Anderson Brothers, Houston.

Aluminum-Alloy Pipe Is Proposed for New Line

WASHINGTON.—Something new in pipe-line construction may be developed if the Federal Power Commission approves a proposal to substitute aluminum-alloy pipe for steel pipe in a short lateral line, submitted by the Alabama-Tennessee Natural Gas Co., of Florence, Ala.

The company has authority to construct a 9,500-ft. 8⅝-in. line to serve the Reynolds Alloy Co. at Listerhill, Ala., and proposes to use an aluminum-alloy pipe of the same diameter and carrying capacity as steel, with a wall thickness and strength adequate to handle the pressures to which the line will be subjected.

During the war, some consideration was given to the substitution of aluminum for steel in pipe lines, but aluminum has such an affinity for earth that underground lines would be subject to rapid deterioration. The metal is used on pipe lines to carry off stray electrolytic currents.

The application filed by Alabama-Tennessee explained that the total cost of construction will be increased by approximately $6,300 because of the substitution, but the higher expense

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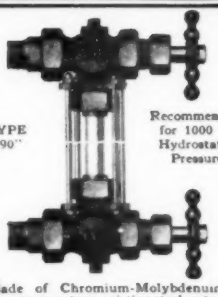
DROP FORGED STEEL
LIQUID LEVEL GAGES



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Two oil settling compartments greatly increase the efficiency of Parkersburg treaters. The initial compartment acts as free water knockout and heat exchanger so that pre-heated emulsion, with all free water removed, is introduced into the main settling chamber.

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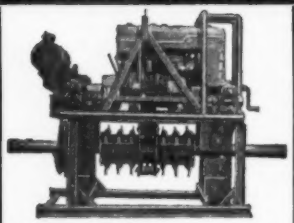
MODEL M
CLEANING MACHINE



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Standard models:

Model M—3" to 14" Pipe Cleaning machine
Model K—16" to 26" Pipe Cleaning machine
Cleaning and priming machines for larger pipe sizes also available.

Available on rental or outright sale basis.

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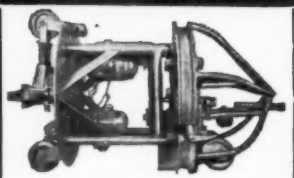
CROSE
ELECTRIC MODEL
INTERNAL LINE-UP CLAMP



The electric model shown above is a rugged, heavy-duty clamp, electrically operated for the tough jobs.

ADVANTAGES:

For The Owners:
Better stringer bead; better finish weld; better pipe line.

For The Builder or Contractor:
Speed; stringer bead cut-out eliminated; economy; swabbing and alignment with one tool; less labor required.

Available for pipe sizes 12" through 36"
Rental or Outright Sale Basis

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is expected to be materially offset by reduced future maintenance and longer service life.

Tulsa U. to Teach Pipe-Line Accounting

"Pipe-Line Operations and Accounting," first course of its kind, is being offered this fall by the University of Tulsa in cooperation with several major pipe-line companies.

The course will instruct employes of pipe-line companies and college students in the most important accounting problems of pipe-line operation.

J. L. Shoemaker, financial vice president of Stanolind Pipe Line Co., and J. W. Cason, controller of Interstate Oil Pipe Line Co., originated the idea about 1 year ago.

The present outline of the course was determined by a steering committee made up of men from Stanolind Pipe Line Co., Interstate Oil Pipe Line Co., Texas Pipe Line Co., Gulf Refining Co., and Tulsa University faculty members.

Paul J. Graber, professor of accounting, in charge of the course, explains that pipe-line accounting differs from regular accounting in several ways.

Pipe-line personnel will lecture, including Emil Wienecke, traffic administrator, T. R. Aude, director of planning and economics, and Shoemaker; Stanolind Pipe Line Co.; J. C. Rawlins, assistant to the manager southern division, J. L. Seger, vice president and general counsel, and Cason, Interstate Oil Pipe Line Co.; Loy J. Shelton, chief supervising clerk, Texas Pipe Line Co.; and E. D. Loughney, assistant secretary and auditor, Gulf Refining Co. M. H. Diels of the university faculty will teach general accounting. These men wrote most of the textbook. Eventually, faculty members will give all the lectures.

Colombia Reveals Plans for 268 Miles of Products Lines

Plans for products lines totaling 268 miles have been presented by the Minister of Petroleum of Colombia before the Senate Oil Committee during recent hearings in Bogota.

The proposed projects have been estimated to cost $6,430,000. They include the following: a 90-mile, 6-in. line from Puerto Berrio to Dorado with capacity of 5,500 bbl. daily to cost $2,680,000; 103-mile, 4-in. line from Puerto Berrio to Medellin, capacity 2,100 bbl. daily, to cost $2,500,000; 75-mile, 4-in. line from Buenaventura to Cali, 2,300 bbl. daily capacity, to cost $1,250,000.

Surveys for the three lines have been contracted.

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ANY PRESSURE — ANY TEMPERATURE

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for pinhole or corrosion leaks.

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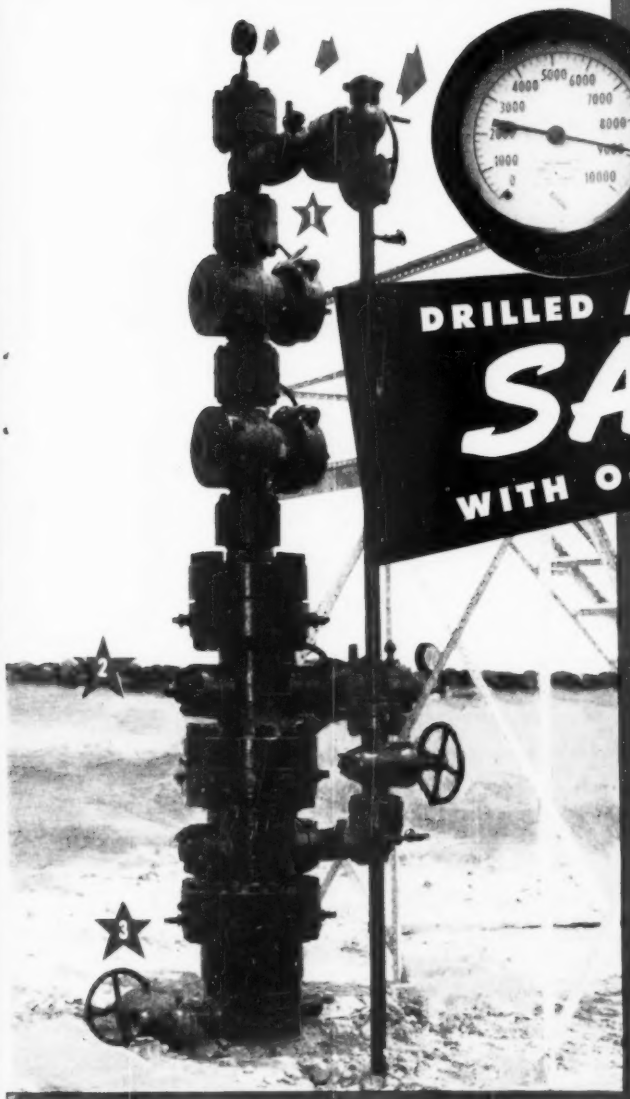

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...WORLD'S HIGHEST PRESSURE WELL

DRILLED AND COMPLETED SAFELY WITH O-C-T EQUIPMENT

1 O-C-T PC CHOKE

2 O-C-T TUBING HEAD

3 O-C-T "C-19" CASING HEAD

Twice this year, Oil Center Tool Company equipment has been used on world record wells . . . on the world's deepest well in Wyoming and now on the world's highest pressure well in Louisiana.

On Continental Oil Company's Estes No. 1, located near Welsh, La., the pressure gauge stood at 8,920 pounds tubing pressure. Bottom hole pressure is ± 11,000 psi. The well is 11,476' deep. The production sand is from 11,263'- 11,269'.

With the O-C-T "C-19" casing head as the foundation, the wellhead assembly on this world's highest pressure well consists of the C-19 casing head and the O-C-T T-16 OU tubing head, "topped off" by the new O-C-T PC production choke.

On your next well . . . on wells of any depth or pressure . . . take advantage of the added strength, safety, convenience and flexibility provided by dependable Oil Center Tool Company equipment. As a result of progressive engineering and precision manufacturing practices, O-C-T now produces a line of "precisioneered" products which have materially increased the margin of safety in drilling, completing and producing deep, high pressure gas and oil wells.

O-C-T CONGRATULATES THE MEN WHOSE SKILL AND COURAGE WERE RESPONSIBLE FOR SAFELY DRILLING AND COMPLETING THIS WORLD'S HIGHEST PRESSURE WELL.

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NATURAL GAS

Mississippi River Fuel Asks Gas-Sales Increase

Mississippi River Fuel Corp., St. Louis, has filed an application with Federal Power Commission proposing to increase the daily sales capacity of its natural-gas transmission system to 328,000,000 cu. ft. by the installation and operation of additional compressor units in Louisiana, Arkansas, and Missouri.

The company proposes to use the additional facilities to meet the increased demands of its existing customers; to deliver natural gas for distribution in 29 communities in Arkansas and Missouri which are now without natural-gas service; and to connect additional main-line customers which will use natural gas for industrial purposes in Arkansas, Missouri, and Illinois.

The proposed construction program includes installation of compressor units totaling 13,000 hp. in three new stations and additions totaling 3,000 hp. to two previously authorized compressor stations. The application says the three new stations are to be constructed by a third party at an estimated cost of $2,470,000 and leased to Mississippi River Fuel. The compressor facilities to be added by Mississippi to its existing stations are estimated to cost $570,000.

Mississippi's transmission system extends from northern Louisiana through Arkansas and Missouri into Illinois. The company sells natural gas to utility-distributing companies for resale for domestic, commercial, and industrial purposes, and directly to certain industrial consumers. Its principal sales are made in Illinois and Missouri in the vicinity of St. Louis, and East St. Louis and Alton, Ill.

FPC Authorizes Acquisition Of New Jersey Gas Line

Federal Power Commission has authorized Texas Eastern Transmission Corp., Shreveport, to acquire approximately 23,792 ft. of 8-in. natural-gas pipe line in New Jersey from Public Service Electric & Gas Co., of Newark.

Texas Eastern plans to operate the line as part of its main transmission system to make deliveries and sales of natural gas to Public Service. Estimated cost of the line, which has a maximum capacity of 10,000,000 cu. ft. per day, is $87,300. The line is located in Middlesex County and extends from Public Service's Central Gas Works in Raritan Township to a point near Texas Eastern's Big Inch line in South Plainfield Borough.

Texas Eastern was ordered by FPC last February to deliver up to 4,500,000 cu. ft. of natural gas per day to Public Service, and the latter company subsequently constructed the 23,792-ft. section of line for the purpose of receiving the Texas Eastern gas.

Consolidated Starts Work On New Elk City Gas Line

Consolidated Gas Utilities Corp. has started construction of a 14-mile, $12\frac{3}{4}$-in. pipe line to the Elk City, Okla., field.

The company recently entered into a contract with Shell Oil Co. to purchase gas from this field, and the contract will increase the cost of gas to Consolidated to the extent that company-owned production is supplemented by purchased gas. The new line will connect the company's system with an important new gas reserve. Pipe for construction of the new line is on hand.

Gas Would Help Industry in South, FPC Examiner Told

Alabama and South Carolina city representatives told a Federal Power Commission examiner last week in Tallahassee that natural gas piped into the Southeast will help promote their industrial development.

Arthur M. Field, chief engineer, Charleston Development Board, Charleston, S. C., said that more than 11 per cent of the Charleston labor force now is out of work and new industries must be sought to absorb the unemployment. He said industries now are reluctant to locate in the area because of inadequate and more costly power supplies.

The FPC hearing was held to determine whether Atlantic Gulf Gas Co. should be allowed to extend its natural-gas pipe liner from Texas to Charleston.

A group of representatives of Alabama cities which are not on the proposed pipe-line route asked that FPC order the company to serve them if it serves neighboring cities. They claimed natural gas would give rival communities an advantage over them in efforts to attract new industries.

Piedmont Offers Highest Price for Natural Gas

The highest price ever offered for natural gas on a long-term, large-volume basis, was made by Piedmont Natural Gas Co. last week.

Piedmont, now in hearing before Federal Power Commission in Washington, D. C., for permit to construct a 26-in., 1,290-mile pipe line from Coastal Louisiana through the Carolinas to Danville, Va., seeks the supply of 250,000,000 cu. ft. of gas daily for 20 years. A price of 11.5 cents and deviation correction has been offered through the law firm of Doerner, Rinehart & Stuart, Tulsa.

Texas Pig-Iron and Steel Plant to Use Gas as Fuel

HOUSTON.—Construction was scheduled to start late this month at Longview, Tex., on a $1,000,000 pig-iron and steel plant which will use natural gas for heat rather than the conventional coke.

The plant will use the Madaras direct-reduction process which reduces sponge iron by use of natural gas. Capacity of the unit will be 2,000 tons of sponge iron a month. East Texas Electric Steel Co. will operate the project for Southwestern Metals, Inc.

Natural Gasoline

Todd Field Gasoline Plant To Be Finished November 1

Construction is expected to be completed by November 1 on the natural-gasoline plant now being erected cooperatively by 23 operators in the deep Todd pool of Crockett County, West Texas, according to Continental Oil Co., operator.

Continental was selected as plant operator by the other 22 participants when work on the project began a year ago.

The completed gas-recovery plant will have a daily capacity of 60,000 gal. and will handle all of the gas produced in the pool. A 25-man crew will operate the plant.

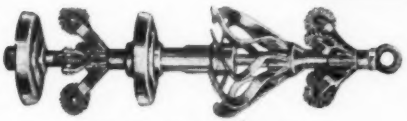
Fire Damages Shell Oil's Iowa, La., Gasoline Plant

More than half of Shell Oil Co.'s 15,000-gal.-per-day natural-gasoline plant near Iowa, in Calcasieu Parish, Louisiana, was destroyed by fire last week, and damage was estimated at $100,000.

The fire started in a still used to process natural gas. No one was injured.

Keep your pipes clean!

NORTHRUP GO-DEVILS



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Sun Dual Flow Filters provide a positive lubricating oil filtration that keeps oil CLEAN at all times—under any operating condition! You'll have fewer oil changes because Sun Dual Flow Filter's continuous REFINING process positively prolongs the life of the lubricant.

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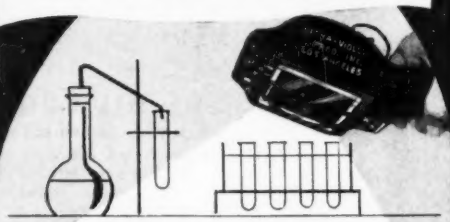

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Number of Active Rotaries Continues Downward Trend

The number of rotary rigs operating in the United States and western Canada during the week ended Septemper 19 (latest report) dropped to 1,996, the smallest number since the week ended January 31, when 1,941 active operations were reported. The number, as of the latest report, was 8 below that of the previous week, 40 below the number operating a month ago, 171 below that of the peak week this year (week ended April 25), and 319 less than at this time a year ago.

ROTARY RIGS IN OPERATION*
(United States and Western Canada)

Area—	Week ended 9-19-49	Change week ended 9-12-49	Change week ended 9-20-48
Gulf Coast	545	+ 19	— 33
W. Tex.-N. M.	532	— 13	— 61
Ark.-N. La.-E. Tex.	151	+ 3	— 26
Oklahoma	204	— 20	— 97
Kansas	114	+ 1	— 27
Illinois-Eastern	110	— 6	— 39
Rocky Mountains	105	— 4	— 66
Pacific Coast	168	+ 15	— 12
Total United States	1,929	— 5	—337
Western Canada	67	3	+ 18
Total	1,996	— 8	—319

*Hughes Tool Co.

Pabco Drilling Co., Wichita, has contracted with White Eagle Oil Co. to drill a test in northern Wabaunsee County, northeastern Kansas. The location, in rank wildcat area, is on the latter's Uhlrig lease in 8-11-12e, 4 miles northwest of Maple City. Hole will be carried to the Arbuckle lime.

Decem Drilling Co., Oklahoma City, is the contractor for Shell Oil Co. on the latter's 2-A Bell, a projected 5,500-ft. test in 24-1s-4w, Stephens County, Oklahoma.

Drilling Contractors, Ltd., Calgary, has started a Devonian test for Anglo Canadian Oil Co., Ltd., in the Elk Point area, 55 miles northwest of Lloydminster, in Alberta Province, Canada. The location is 4 miles northwest of gas production which has been found in the Viking and Lower Cretaceous sands.

Beardmore Drilling Co., Wichita, is drilling a rank wildcat test in northwestern Harper County, Kansas, for Drillers Gas Co. The test, 1 Grabs, 13-31-9, is 17 miles east and 2 miles north of the Whelar pool, nearest production.

White-Webb Drilling Co., Dallas, is drilling deeper at O. W. Killam 2 Freeman, Lupton Survey, 5 miles southwest of Scurry, Kaufman County, Texas. The well was dry in the Paluxy at 3,410 ft., and will be carried to the Bacon lime, expected around 4,600 ft. This contractor also is drilling Robert Lake 1 Fox, D. F.

Day-tour crew for Olson Drilling Co., Tulsa, on Gulf Refining Co. 8-B Mattern, Eunice field, Lea County, New Mexico. Left to right: Albert Owings and W. R. Lee, floormen; Alvin Helms, derrickman; and Gene Evans, driller

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For oil field, locomotive type and marine boilers. Water shows black — steam shows white; the water level is unmistakable. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler. Conforms with A.S.M.E., Federal and State requirements when used for pressures specified by their respective codes.

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WRITE FOR BULLETIN 329P

POWERS

Webb Survey, 2 miles northeast of the new Walter Fair Paluxy field, and the Walter Fair 1-B Wynne, Spiked Survey, in the same county.

Loffland Brothers Co., Tulsa, has contract to drill 1 Augusta C. Barrow Estate, SW SW 22-44-T1S-T&P Survey, Ector County, West Texas, for Bayard Ewing and associates. The 5,100-ft. wildcat is 8 miles north of Odessa and about 3 miles west of the North Cowden field.

Stansbury, Inc., Los Angeles, contractor for Bell Corp. on the latter's recently completed 45-6 Johnson, which extended the South Cuyama field, Santa Barbara County, California, 3,500 ft. to the southeast, has skidded the rig a location west for a second well (35-6 Johnson) for the same operator.

N. V. Duncan, Oklahoma City, is the contractor and joint operator with General American Oil Co. on a wildcat test, 1 Shircliff, being drilled 2 miles north of the Northwest Crescent pool, in 17-18n-3w, Logan County, Oklahoma. Projected depth is 5,450 ft.

Fowler Drilling Co. is the contractor for Vernon Cunningham and associates at their 1 Exeter and 1 Victory, two new operations in the Long Beach field, California.

T. T. Eason Drilling Co., Oklahoma City, which has joined American contractors operating in western Canada, is now drilling for Imperial Oil, Ltd., in the Redwater area, northeast of Edmonton, Alta. Present active operation is at 38 Redwater in LSD 3, 29-57-21w4.

Burnham & Browning Drilling Co., Shreveport, has the drilling contract on a joint operation with Dunn and Laurent for 1 F. O. Gilbert, SE NW NW 34-18n-13w, in the new Bossier City field, Bossier Parish, Louisiana. Location is a south offset to the discovery well.

Warren and Bradshaw Drilling Co., Tulsa, as the contractor for Coronado Oil Co., an affiliated operating company, is starting a second well in the new Booch sand pool just opened by this company in 15-6n-9e, 4 miles north of Atwood, Hughes County, Oklahoma. The new test, 1 White, is an east offset to the discovery well, which topped the pay at 2,800 ft.

Judy Drilling Co. is drilling for Sunray Oil Corp. at 1 Ben Williams, an east offset to M. B. Armer and Culham Petroleum Co. 1 Seran, just completed as the discovery well of a new Dutcher sand pool, in 30-13n-9e, Okfuskee County, Oklahoma. The latter well produces from a depth of 3,420-60 ft.

Mohawk Drilling Co., Oklahoma City, is starting a second well for Davidor and Davidor in the new Gilcrease sand gas area in the South Wetumka district, Hughes County, Oklahoma. The new well, 2 Newlin, is ½ mile south of the latter operator's recently completed Roberts gasser. Wells find the pay at depths of 2,600 to 2,700 ft.

Quad Drilling Co. is the contractor on a wildcat test being started for Stanolind Oil & Gas Co. at 1 Pardue, 9-16-7e, west of the Big Creek field, Richland Parish, eastern Louisiana. Hole will be drilled to the Tuscaloosa.

E. F. Moran, Inc., Evansville, Ind., has been given the contract to drill W. A. Schuller 2 Anderson, 30-2s-11w, a McClosky lime test in the Owensville North pool, Gibson County, Indiana.

Canadian Drilling Co., Calgary, is the contractor on the New Pacalta-Whitemud No. 3, wildcat test being started in LSD 16, 15-51-25w4, Alberta Province, Canada.

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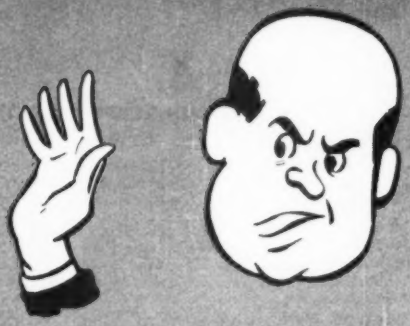

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Exploration and Drilling

Mitchell-Scurry County Reef Trends

IN extreme northwest Mitchell County, Texas, just a few miles south of reef production in the Sharon Ridge area of Scurry County, Standard Oil Co. of Texas 1 Dunn in Section 64, Block 20, Lavaca Navigation Survey, looks like a prospective field opener. Unfortunately for the peace of mind of the geologists, production is coming from a reef pay that is undoubtedly older than the Scurry County development and several hundred feet below the water line of the producing area immediately north.

From an elevation of 2,249 ft., the Dunn test has a reported call on top of the reef at 7,380 ft., or datum of —5,131 ft. For this comparison, one can call the water level in Scurry County —4,500 ft. After missing the regular reef top, the Dunn was drilled to the Ellenburger, total depth 8,325 ft., found water, and then came uphole testing. Drill-stem test at 7,565-7,685 ft., (—5,316 to —5,436 ft.), open 5 hours, had gas in 5 minutes, drilling mud in 10 minutes, oil in 15 minutes. Flow was directed into pits for 3 hours, 45 minutes without gage or estimate of oil recovery. The final-hour flow was turned into tankage and gaged 60 bbl. of fluid, composed of 42 bbl. of 42 -gravity oil and 18 bbl. or drilling mud and salt water.

Present plans call for running 7-in. pipe to about 7,685 ft., and attempting to cement off hole below that depth. The 7,565-7,685-ft. interval will then be perforated for completion tests. Then it can be determined whether salt water came from the pay zone or from lower formations not sealed off completely when drill-stem test was made.

This new development will certainly cause a revamping of many geological theories about the Scurry County region and its reef production. There have been enough problems already to keep most geologists from being too sure their picture was the correct one. About the only thing reasonably sure now is that this reef production is geologically older than that to the north in Scurry County. How much? Is it Strawn or is it still Canyon? Even the rashest geologist is not going to guess until he has a chance to work over the electric log on the Dunn and try correlations with other wells. Does it correlate with the reef production at Vealmoor due west across Howard County? It is pretty close to the same datum, but Vealmoor ought to be regionally some 500 ft. deeper for any given formation.

The new prospect is only about 40 ft. higher on the reef top than some dry holes a few miles west. Yet it was testing a 120-ft. section. How much of this is actual pay? More headaches trying to find the answers to reconcile these facts, or at least what now seem to be facts.

If you follow the general theories of reef formation and why they are so widespread in this area, you can still ask yourself two questions. Is this just another spot of reef production, older geologically, that just happens to be located pretty close to an area where a younger reef produces a lot of oil? Or will you "stick your neck out" and guess that maybe this older and deeper reef might also produce to the north under at least parts of the same general area that are now producing from the younger and shallower reef?

If you decide that this deeper reef's being close to Scurry County doesn't mean too much, then you guess whether you have a trend of production possibilities over a sizable area. If so, which direction should you play? If you think it might also underlie Scurry County's shallower reef, what are you going to do? Will you take a chance on "gumming up" the reef pay in a good shallow well by drilling on through to test this deeper reef? Reefs are pretty irregular; have enough dry holes been drilled deep enough to the north to condemn anything much up there for the deeper pay? Drilling will give some of the answers—at a price.

Charles J. Deegan

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

TEXAS GULF COAST.—Yegua sand oil production has been opened in the South Cabeza Creek Wilcox sand field, Goliad County. Continental Oil Co. 3 Elmo Reed, George Elliott Survey, flowed 50 bbl. of oil in 11 hours through 3/16-in. choke. McCarthy Oil and Gas Corp. 1 J. P. Jamieson, confirmation test to the Collins Lake field, flowed at the rate of 644 bbl. of oil daily. The well was drilled to a total depth of 10,500 ft. and nine oil sands were found in the last 1,200 ft. These sands are still to be tested.

WEST TEXAS.—In the southeast extension area of the North Snyder field, Scurry County, operators have confirmed the top on the Canyon lime at 6,174 ft., making it 506 ft. high structurally to the Moncrief extension well. Humble 5 Cunningham, Doss field Canyon lime discovery, Gaines County, prepared to squeeze and perforate higher when sulfur water was encountered through perforations at 8,875-8,947 ft.

EAST TEXAS.—Stanolind and Continental's 1 Highland Lake Club, north offset to the 1 George Slaughter in Harrison County, 2-year-old discovery which made a small flow of gas and distillate from the Pettit lime, promised extensive development for the area when it gaged 83,000,000 cu. ft. of gas a day, plus 40 bbl. of distillate per 1,000,000 cu. ft. Completion was through perforations in the Pettit at 6,372-98 and 6,414-55 ft., and 6,512-25 ft. The lower set was believed to be in the Pettit-Travis Peak transition zone.

ROCKY MOUNTAIN AREA.—In Montana two wildcats showed saturation. The Texas Co. recovered oil from Amsden at Sumatra, Rosebud County, and General Petroleum Corp. found saturation in top of Madison at its proposed Devonian test in the Collins area, Teton County. Farmers Union Central Exchange, Inc., of Billings, recovered oil in top of Tensleep at Murphy Dome, Hot Springs County, Wyoming, for an apparent discovery on that structure.

MISSISSIPPI

Stanley Sand Zone Tested In Jones County

JACKSON.—In Jones County, approximately 6 miles north of Laurel, Red Wing Drilling Co. et al 1 Torry Smith, 32-10n-11w, cored and drill-stem tested gas condensate in the Stanley sand zone of the Eutaw. Drill-stem test at 5,500-26 ft. recovered 375 ft. of water cushion, 135 ft. of mud, and 120 ft. of mud cut with amber condensate in 11 minutes with top pressure reaching 1,000 psi. First possible salty taste was noted in core at 5,576-86 ft. Gas odor and taste were noted in cores between 5,540-76 ft. but very slight porosity or permeability was noted. Operators are now drilling below 6,025 ft.

Humble Oil & Refining Co. plugged back from total depth of 11,159 ft. and set 5½-in. casing at 4,815 ft. in the 1 Laura Butler, 15-5n-3w, Adams County. Casing was perforated at 4,761-63 ft. in the Wilcox section. The well flowed 25 bbl. of fluid per day, being 80 per cent salt water and 20 per cent oil or condensate. Gas was estimated at 500 M.c.f. If a faulty cement job is not responsible for the water this test would not indicate commercial production.

Danciger Oil & Refining Co. 1 Mrs. Kate S. Logan, discovery well for the new Rodney field, 18-10n-1w, Jefferson County, flowed 110 bbl. of 58°-gravity condensate plus 1,800 M.c.f. gas per day through 11 64-in. choke with tubing pressure of 2,300 psi. Lower perforations were squeezed and operators drilled out to 9,415 ft. and perforated at 9,406-10 ft. The well is now shut in.

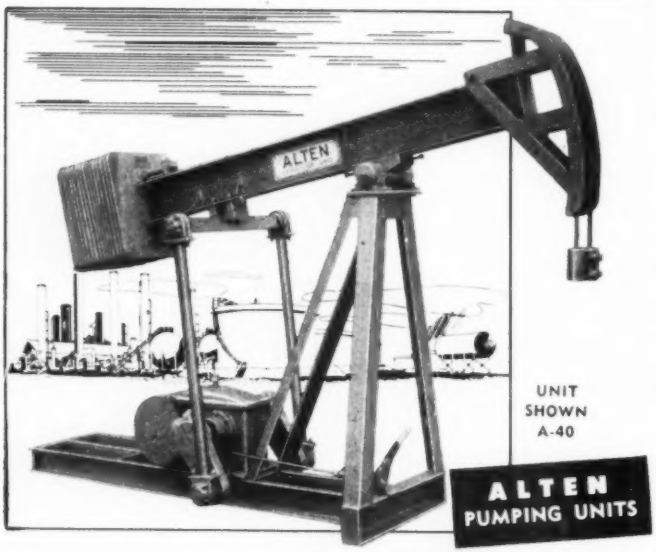
Eight miles north of Baxterville field, Union Producing Co. 1 Pinelands Minerals, Inc., 30-3n-16w, Lamar County, is drilling below 7,432 ft.

Humble Oil & Refining Co. is coring at 6,863 ft. in the 1 O. B. Bowen et al, wildcat, 6-4n-8w, Greene County. Core at 6,840-63 ft. had no shows.

MISSISSIPPI WILDCAT FAILURES

Adams County: H. Barksdale Brown & Co. 1 Brandon Hall, 15-7n-1w, dry, TD 6,050 ft.

Sohio Petroleum Co. 1 T. B. Buckles, 18-8n-3w, dry, TD 6,510 ft.



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SOUTH LOUISIANA

North Extension Well Completed in De Large Field

NEW ORLEANS.—Union Producing Co. and Gulf Producing Co. have completed a north extension well at De Large field, Terrebonne Parish. The 2 Buckley-Mahler, 76-19s-17e, is approximately 1 mile north of previous production in this field. The well was drilled to a total depth of 15,460 ft., then plugged back to 13,467 ft. inside the 7-in. casing which was set at 13,489 ft. On initial test the well flowed 4,986,000 cu. ft. of gas per day plus an unestimated amount of condensate through perforations at 13,350-89 ft. through ¼-in. choke. Tubing presure was 3,590 psi. All production in De Large field comes from below 13,000 ft., with previous production having been established at the 13,500-ft. level.

Magnolia Petroleum Co. A-2 State Lease 766, Ship Shoal area offshore from Terrebonne Parish, made a drill-stem test from 6,990-96 ft. and started flowing some gas and condensate through a 9/64-in. choke after 2 hours under pressure of 2,550 psi. Test is bottomed at 7,692 ft. and has 7-in. casing perforated at 7,680 ft. Operator is still testing.

In Cameron Parish, Magnolia has abandoned the 3 Abel West Heirs at 12,123 ft. after having a flow of 500,000 cu. ft. of gas per day through a 12/64-in. choke from the 10,690-10,700-ft. level.

P. A. Ward Co. has gaged the 1 Winnifred B. Vincent oil discovery approximately ½ mile south of Ritchie production, Acadia Parish, for 74 bbl. of 25°-gravity oil per day through a 10/64-in. choke. The well is bottomed at 4,032 ft. and is flowing through perforations at 3,681-86 ft.

Bennett Brothers are running log on their 1 L. K. Nicholson, 110-6s-9e, Pointe Coupee Parish wildcat. Test is totaled at approximately 8,500 ft. and has a projected depth of 10,500 ft. No shows have been indicated so far.

Magnolia has located a 14,000-ft. wildcat approximately 3 miles northeast of Opelousas, 41-7s-4e, St. Landry Parish.

An attempt for a confirmation well for South Timbalier field, offshore from Terrebonne Parish, has failed for Humble Oil & Refining Co. The company reported that the A-2 State Lease 1034, Block 34, has been plugged and abandoned at total depth of 13,339 ft.

Superior Oil Co. is still testing the A-1 State Lease 1164, ofshore from Cameron Parish. The wildcat flowed a considerable amount of gas on drill-stem test.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Acadia Parish: New oil discovery—P. A. Ward Co. 1 Winnifred B. Vincent, 14-7s-1w, approximately ½ mile S of Ritchie production, top sand 3,681 ft., perf. 3,681-86 ft., IP 74 bbl. oil per day, 10/64-in. choke, TP 50 psi., 25° grav.

SOUTH LOUISIANA WILDCAT FAILURES

Cameron Parish: Magnolia Petroleum Co. 3 Abel West Heirs, 28-14s-10w, 4 mi. NE of 1 West discovery at Holly Beach field, dry, TD 12,123 ft.

Vernon Parish: W. T. Burton 2 W. T. Burton, 29-1n-6w, approximately 13¼ mi. NNE of Hammons, dry, TD 10,031 ft.

KANSAS

First Oil Production for Hodgeman Indicated

FIRST production for Hodgeman County in the western part of the state is indicated at The Texas Co. 1 Nuss, NW NW NE 24-22-25, which has encountered favorable oil showings in the Arbuckle lime and has run casing to test. This rank wildcat, 7 miles northwest of Jetmore and about 25 miles north of Dodge City, topped Arbuckle at 5,153 ft. (—2,673 ft.). Rotary hole was drilled to 5,215 ft. and 7-in. casing run to 5,154 ft., 1 ft. in the top of the pay. The location is 50 miles to the east of the Hugoton gas field. Nearest oil production is in the small, isolated Manteno pool, about 20 miles to the north in Ness County. Standard tools are being set up to drill in.

Champlin Refining Co. 1 Moore, NW NE SW 14-26-14, 2 miles southwest of the Moore pool, in Pratt County, is looking somewhat better after a 20-qt. nitro shot. Testing Kinderhook sand at 4,283-4,303 ft., it bailed only a small amount of oil with some water before shooting. Since the shot, it has swabbed at the rate of 20 bbl. of oil per day and may make a small pumper. Prior to testing the present zone, hole was drilled to the Arbuckle, topped at 4,502 ft. (—2,520 ft.), and to a total depth of 4,535 ft., where no showings were obtained. It then was plugged back to 4,300 ft. and 5-in. casing run to 4,281 ft. Kinderhook has been checked at 4,285 ft.

In eastern Ellis County, another possible new pool is in the making at E. H. Adair 1 Froelich, SW SE SE 27-12-16, 2 miles west of the Fairport pool. Oil showings were found in the Arbuckle, topped at 3,541 ft. (—1,471 ft.). Rotary hole was carried to 3,543 ft., after which casing was run to the top of the pay. Standard tools are being set up to drill in.

Ben F. Brach 1 Kock, NW NW NW 19-17-14, established a pumping potential of 36 bbl. per day to open another producing area in Barton County. Pay is the Arbuckle, topped at 3,399 ft. (—1,493) and drilled to 3,411 ft., with casing cemented 1 ft. in the top. Since testing was started, a west offset, 1 Axman, NE NE NE 24-17-15, has reached the pay zone, and in initial tests swabbed at the rate of 2 bbl. per hour to confirm the discovery. The latter topped the zone at 3,389 ft. (—1,498 ft.), 5 ft. lower than in the first well. Hole was drilled to 3,394 ft., with casing on top the pay.

KANSAS SUCCESSFUL WILDCATS

Barton County: Bay et al 1 McCauley, NW NW SE 34-17s-13w, IP 121 bbl., 3,276-80 ft., TD 3,408 ft.

McPherson County: Kornfeld 1 Johnson, CEL SE NE 13-19s-2w, gas, 2,885-60 ft., TD 2,860 ft.

Stafford County: Delta et al 1 Heldebrand, NW NW SE 2-24s-12w, IP 5 bbl., 3,771-80 ft., TD 3,955 ft.

KANSAS WILDCAT FAILURES

Barton County: Musgrove 1 Sette, SE SE NW 31-17s-13w, dry, TD 3,395 ft.

Hartman 1 Harris, NW NW SE 36-19s-13w, dry, TD 3,489 ft.

Butler County: Rex & Morris 1 Whitson, SW SE NE 17-26s-3e, dry, TD 2,888 ft.

Graham County: Hansen 1 Eichman, SE SE SE 12-9s-21w, dry, TD 3,773 ft.

Lyon County: C. B. Phillips 1 Miller, NE NE SE 36-21s-12e, dry, TD 1,998 ft.

Marion County: Thrifty 1 Hawk, SE SE SW 14-22s-5e, dry, TD 2,799 ft.

Meade County: Northern Natural Gas Co. 1 Clancy, C SE NW 4-30s-30w, dry, TD 5,893 ft.

Pratt County: Olson 1 Briggeman, NE NE SE 34-26s-13w, dry, TD 4,451 ft.

Reno County: B. & R. et al 1 Bauman, NE SW SE 13-24s-5w, dry, TD 3,406 ft.

Rooks County: Stearns et al 1 Hardman, NW NE NE 34-7s-16w, dry, TD 3,515 ft.

Anschutz 1 Shepard, NW NW NE 24-10s-18w, dry, TD 3,716 ft.

Russell County: Murfin 1 Brack, NW NW NW 17-15s-12w, dry, TD 3,364 ft.

Stafford County: Crown 1 Prescott, NW NW NW 33-23s-13w, dry, TD 3,806 ft.

Sedgwick County: Westgate-Greenland 1 Vogt, NW NW NE 32-25s-2e, dry, TD 3,034 ft.

Gaty 1 Beach, SW NE NE 9-26s-2e, dry, TD 3,372 ft.

OKLAHOMA

Wildcat in Payne County Gets Showing in Red Fork

INDICATIONS of possible production in the Red Fork sand have been given in a wildcat located 3 miles southwest of the Agra pool in Lincoln County. Ray P. Diehl 1 A. W. Hall, NE SE NW 10-16n-3e had the sand at 4,143-53 ft., a drill-stem test of it resulted in a recovery of 840 ft. of oil and gas-cut mud. Tool was open 2 hours for the test. Hole is being deepened for a look at the Bartlesville sand before attempting a completion.

In Grant County, another wildcat, 3 miles northeast of Lamont, also is showing for a possible producer in the Mississippian. It is Anderson-Prichard Oil Corp. 1 Hamburg, NE NE SE 21-6n-3w. Hole was drilled by Foundation Oil Co., which has sold its interests to the present operators. Mississippian was topped at 4,855 ft., and in a drill-stem test with bottom at 4,945 ft., operators recovered 230 ft. of oil and gas-cut mud. Since then, hole has been deepened to the Wilcox at 5,416-27 ft., where a drill-stem test got salt water, and has been plugged

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back to the Mississippian and casing cemented at 5,005 ft. for completion in the latter pay.

(Continued on page 141)

TEXAS GULF COAST

Yegua Sand Production Opened in Goliad County

HOUSTON—Yegua sand oil production has been opened in South Cabeza Creek Wilcox sand field, Goliad County. Continental Oil Co. 3 Elmo Reed, George Elliott Survey, flowed 50 bbl. of oil in 11 hours through a 3 16-in. choke. The well was drilled to a total depth of 8,371 ft., where it bottomed in the Wilcox formation and 6-in. casing set at 4,890 ft.

McCarthy Oil & Gas Corp. 1 J. P. Jamieson, C. Smith Survey, confirmation test to Collins Lake field, flowed at the rate of 644 bbl. of oil daily through a ¾-in. choke. The well went to a total depth of 10,500 ft. and nine oil sands were found in the last 1,200 ft. These sands are still to be tested. The field was first established early in July when McCarthy 1 Willy was brought in. It was completed in two sands, one of which was a gas and condensate zone.

A new shallow pay, probably in the Jackson series, has been discovered by the A. O. Phillips 1 Roger W. Armitage in the Copeland Creek area of Polk County. On drill-stem test at 3,336-58 ft., the well recovered 300 ft. of pipe-line oil and 200 ft. of oil-cut mud with a working pressure of 200 psi. Total depth of the venture is 3,358 ft. The discovery is located in the Augustine Viesca Survey.

Brazos Oil & Gas Co. has gaged the 2 Powderhorn Co. for a gas-discovery well in the Juan Cano Survey, Calhoun County. The well was drilled to a depth of 5,150 ft. and through perforations at 4,650-60 ft. it flowed 23,000 M.c.f. gas per day on open flow.

Fidelity Oil & Royalty Co. has drilled to a depth of 4,600 ft. and 5½-in. casing is being set to 2,100 ft. for production test in the 1 J. H. Simpson, wildcat in Lavaca County. The test is in the Amanda de la Croix Survey, 1¾ miles northeast of Hunt's 1 Smothers gas discovery.

Stanolind Oil & Gas Co.'s Spindletop dome wildcat test, the B-3 Gladys City Oil, Gas & Manufacturing Co., has been plugged back to 3,100 ft. and sidetracked at 3,129 ft. The test is now drilling below 3,431 ft.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Calhoun County: Gas discovery—Brazos Oil & Gas Co. 2 Powderhorn Co., Juan Cano Sur., 5 mi. NW of Port O'Connor, top sand 4,650 ft., TD 5,150 ft., perf. 4,650-60 ft., IP 23,000 M.c.f. gas per day open flow.

Galveston County: New gas-condensate discovery—Stanolind Oil & Gas Co. 1 State Lease 31709, offshore in Gulf of Mexico, top sand 5,964 ft., TD 11,017 ft., perf. 5,964-68 ft., IP 5,122 M.c.f. gas per day plus 48 bbl. condensate, ¼-in. choke, TP 2,330 psi.

Liberty County: New pay at South Liberty Cities Service Oil Co. E-4 O'Brien, M. G. White Sur., top sand 5,700 ft., TD 7,118 ft., perf. 5,776-5,810 ft., IP 247 bbl. oil per day, 3 16-in. choke, GOR 640, CP 625 psi., 41.2° grav.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: Orlee Oil Co. 1 M. J. White, Refugio County School Land Sur., 1½ mi. SW of Tynanafield, dry, TD 3,005 ft.

Rowan & Hope 1 A. L. O'Neal, EL&RR Sur., A-452, 11 mi. W of Pettus, dry, TD 7,010 ft.

Smith-Story-Wood Corp. and W. E. Fox, Tr., 3 Scott McNeill, Carmen Molino Sur., A-39, 7 mi. E of Beeville, dry, TD 3,196 ft.

Brazoria County: Dillard & Waltermire, Inc., 1 Kittie Nash Groce, Day Land & Cattle Co. Sur., A-590, 3 mi. SE of Damon Mound field, dry, TD 9,540 ft.

Calhoun County: Brazos Oil & Gas Co. 4 Powderhorn Co., Faustina Albarado Sur., 5½ mi. NW of Port O'Connor, dry, TD 5,870 ft.

Chambers County: Kirby Petroleum Co. 1 Earl W. Wilburn, Henry Griffith Sur., A-12, 1 mi. E of Mont Belvieu, dry, TD 6,502 ft.

Harris County: Calvert Corp. and J. M. Turkel 1 T. H. Scanlan Est., V. Blanco Sur., A-2, 10 mi. SE of Humble, dry, TD 4,381 ft.

Refugio County: Hewit & Dougherty J-2 F. B. Rooke & Sons, Antonia de la Vina Sur., 3 mi. SW of Woodsboro, dry, TD 1,187 ft.

Victoria County: Welder-Mecom 1 Minnie S. Welder, Felipe Dimmitt Sur., 3 mi. SE of Victoria, dry, TD 5,401 ft.

Wharton County: W. A. Clark, Jr., 1 Kountz & Stewart, F. C. McReynolds Sur., A-773, 5 mi. NW of Midfields, dry, TD 8,657 ft.

MICHIGAN

Bard Dundee Oil Pool Gets Its Best Producer

MOUNT PLEASANT—W. L. McClanahan and William B. Stewart added the fourth and best producer yet drilled in the 1949-discovered Bard Dundee oil pool, Gladwin County, during the current period. The new producer, operator's 2 Dull, SE NW NE 6-17n-2w, was rated good for 195 bbl. of oil first 24 hours after acidization with 2,000 gal. at 3,935 ft., total depth. Production was restricted to 100 bbl. a day following first 24-hour test period. A 10-ft. pay section, at 3,925-35 ft., was reported to have been drilled.

The 2 Dull diagonal 20-acre southwest offset to the 1 Dull producer, and the farthest completion in this direction in the pool, appeared to confirm the prospect of a sizable and worth-while developmental project in the district, as well as establish the Bard area as one of the best bets yet discovered in the current year.

Operator immediately started moving drilling tools to the direct east 10-acre offset A-1 Dull, SW NE NE 6-17n-2w. The north 10-acre offset to field discovery producer, McClanahan & Stewart 1 Schwartz, SE SE SW 31-18n-2w, Grout Township, Gladwin County, was set for completion in the Dundee after top was logged at 3,879 ft. and 5-in. casing was run and cemented at 3,888 ft.

Two Newaygo County wildcats were being closely watched as drilling approached objective oil horizons. Sun Oil Co. 1 Hatchew, NE NW NW 29-12n-11w, Croton Township, was below 2,200 ft. and near Traverse zone, while Mercer Oil Co., Inc., 1 Smith, SW SW NE 6-12n-14w, Sheridan Township test, had Traverse water at 2,103 ft. and was being drilled ahead towards Dundee section. The Sun well, if dry in Traverse, will be drilled to the Dundee horizon.

MICHIGAN UNSUCCESSFUL WILDCATS

Allegan County, Salem Township: Stanley L. Findley 1 Kipen, SE SW NW 33-4n-13w, Traverse 1,672 ft., dry, TD 1,679 ft.

Saugatuck Township: Arthur J. Boeve 1 Robyler, NW SW NE 35-3n-16w, Traverse 1,330 ft., dry, TD 1,331 ft.

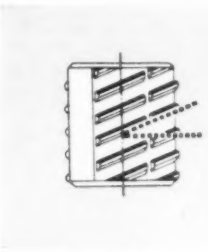
Saginaw County, Spaulding Township: Mercer Oil Co., Inc., 1 Trinklein, NE NE NE 20-11n-4e, Dundee 2,938 ft., dry, TD 3,092 ft.

St. Clair County, Burtchville Township: Sime & Knack 1 Kowalchuck & Kopalnick, SW SE SW 19-8n-17w, Dundee 673 ft., dry, TD 829 ft.

Van Buren County, Waverly Township: Gordon Oil Co. 1 Mowan, SE SE SE 9-2s-14w, Traverse 1,206 ft., dry, TD 1,220 ft.

SECURITY CASING SCRAPER MAY BE RUN THREE WAYS

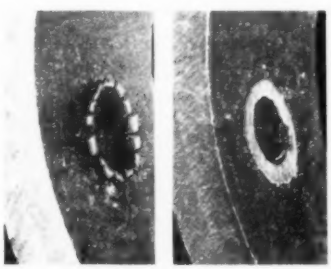
Casing is scraped clean when the Security Casing Scraper is run on either (1) wire line, (2) tubing, or (3) drill pipe. This is possible because it is the only scraper whose cutter teeth contact 360° of the casing circumference at all times. Multiple teeth positively clean every inch of casing with rotary or vertical movement. For example, on the 7" Security Casing Scraper, there are 24 individual shearing teeth which form a total of 98 linear inches of cutting surface. The teeth act upon an obstruction approximately 800 times under average operating conditions.



Reversible Cutter

Tool design and construction is simple and maintenance is easy. Each cutter is held against the casing by three strong coil springs, which exert an even pressure between cutter and mandrel.

The helical teeth on the four opposed, spring loaded cutters produce shearing action which cleans casing quickly, cutting away all burrs or foreign material. Reversible cutters give extra service life.



Perforation Burrs Removed Cleanly

Unretouched photograph of gun perforation before and after removing burrs with Security Casing Scraper. Photo on right shows burr is actually cut (sheared) away, not crushed or broken. For economical scraping, specify Security.

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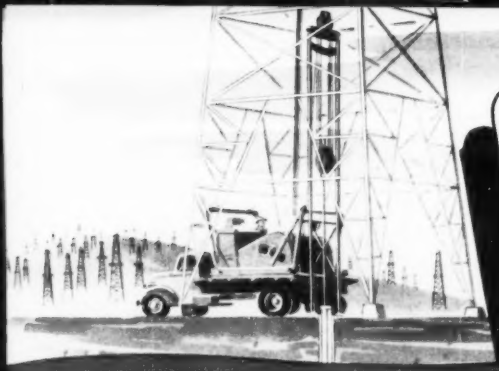
Export Office: Chanin Building, New York City

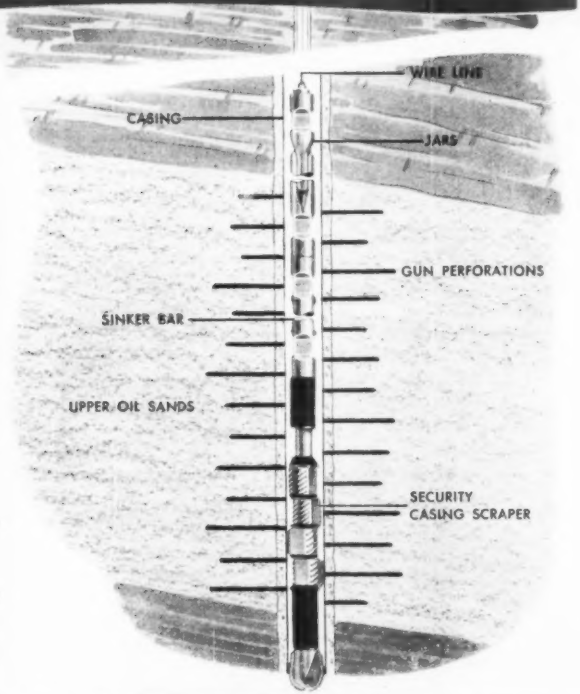


LOCATION: Signal Hill

WELL HISTORY: Depleted production required recompletion at upper pay zone. Gun perforated at 10,000 feet opposite new pay.

PROBLEM: Economically scrape casing perforations without rotary equipment.

How would you Scrape Casing Without a Rotary?



The production superintendent of a large oil company was faced with the problem of scraping 7" casing which had been gun perforated with 150 holes at a depth of 10,000 feet. The only work-over equipment on the job was a small pulling unit backed up to the standard derrick.

The only way he could solve the problem, without moving in rotary equipment, was to run a Security Casing Scraper on wire line. He ran a 7" Security Scraper on 5/8" wire line with a sinker bar above the Scraper and a set of jars above the sinker bar. The scraper was run up and down through the gun perforated section. Only three hours were consumed in this operation, including running in and out of the hole. Packers were run through the scraped section and set without difficulty.

This is a typical example of how the Security Casing Scraper can reduce your work-over costs because it is the only Scraper which does a complete job when run on drill pipe, tubing or wire line. Call your Security Field Representative when you are ready for your next scraping job.

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EASTERN TEXAS

Anderson County Wildcat Coring Ahead From 9,812 Ft.

DALLAS.—Continental Oil Co. 1 Royall National Bank, Anderson County wildcat southeast of Tennessee Colony, was coring its way ahead from 9,812 ft., and at last report was below 9,862 ft. A core from 9,716-62 ft., in the Pettit, had some bleeding oil on fresh break, with pin-point porosity and slight odor, in recovery from around 9,735 ft. Top of the Travis Peak, by core recovery, was placed at 9,816 ft. Gas bubbles on fresh cores were reported to 9,862 ft.

Humble Oil & Refining Co. 1 J. T. Ellis, W. A. Dunnagan Survey, A-236, Anderson County, had total depth of 5,410 ft. in sand and shale, and was reaming. Additional cores from 5,365-5,410 ft. had no shows.

A. O. Phillips 1 E. G. Staples, J. C. Robertson Survey, A-853, Smith County, cored slightly porous sand with fair odor from 7,538-62 ft., and sand with some saturation from 7,562-72 ft. A 1-hour drill-stem test from 7,559-72 ft., using ¼-in. chokes and 1,000 ft. of water blanket, produced a steady blow and recovered the blanket, 4,000 ft. of black oil estimated at 30° gravity, plus 300 ft. of oil-cut mud. A core from 7,575-7,607 ft. recovered 32 ft. of shale with no shows.

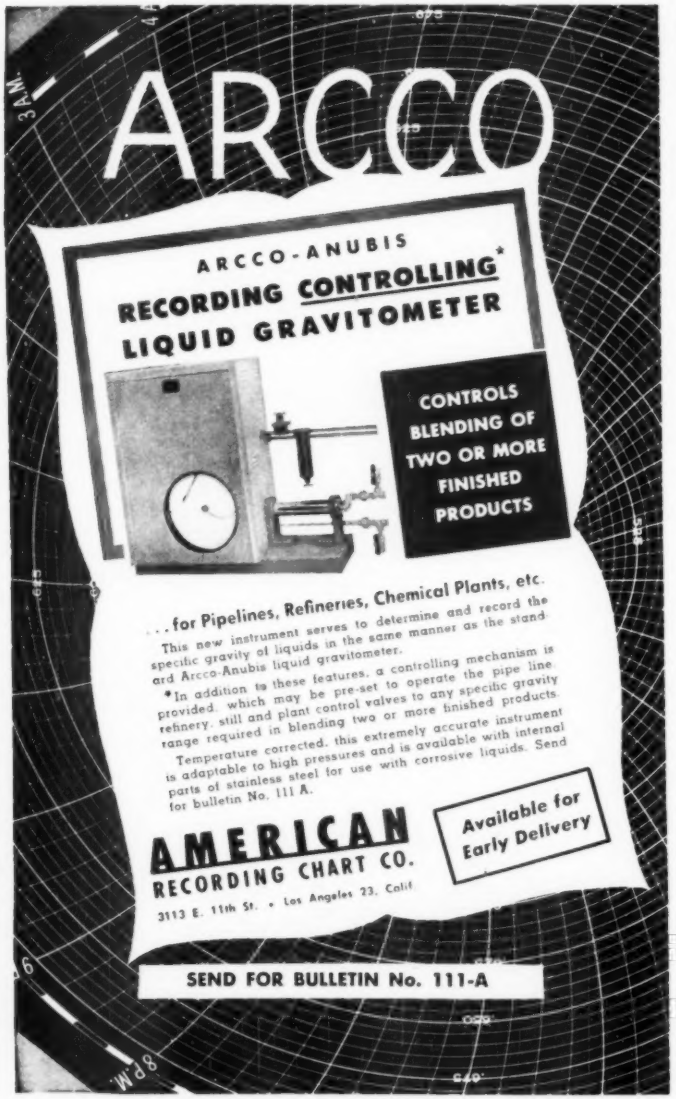
In Titus County, W. M. Coats 1 P. H. Pewitt, Henry P. Banks Survey, A-13, fault-zone wildcat, had total depth at 4,543 ft. in sand, and was erecting tanks. Perforations were made in the Paluxy at 4,507-32 ft. and 4,537-41 ft. Two-inch tubing was run and the hole washed with water but would not flow. In swabbing, the fourteenth run recovered the first oil with fluid level standing 1,200 ft. from top. After cleaning the well, fluid level rose to 800 ft. from the surface. Gravity of the oil was estimated at 20°-22°, with no salt water.

In Upshur County, Tide Water and Seaboard Oil Co. 1 C. K. Wade was drilling at 7,311 ft. in hard sand.

Trinity Production Co. 1-A Humble-Woolverton, Paluxy wildcat 1 mile south of Wills Point in Van Zandt County, topped the Paluxy at 5,633 ft. by electric log and was drilling ahead at 5,642 ft. It was not cored.

EAST TEXAS (DISTRICTS 5, 6, AND 6-P WILDCAT FAILURE

Marion County: Earl Hollandsworth 1 C. C. Braden and Wright, Charles White Sur., 11 mi. W Jefferson, dry, TD 5,000 ft. Georgetown 3,650 ft., elev. 377 ft.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SOUTHWEST TEXAS

Boroso Field Extension Completed by Continental

CORPUS CHRISTI.—Continental Oil Co. has completed the D-7 Mrs. O. H. Davenport for an extension to Boroso field in Starr County. On potential test the well flowed 231 bbl. of 48.7°-gravity oil per day through a 12/64-in. choke. The well was drilled to a total depth of 5,904 ft. with the top of the pay section at 4,180 ft., and is producing through perforations at 4,180-90 ft. with 550 psi. tubing pressure and 950 psi. casing presure. The well is located in the "D" lease in Survey 282.

Operators are continuing to test the John P. Akin-State of Texas, wildcat test in Duval County. An electric log was run to 2,306 ft. and side-wall samples were taken from 1,921-2,216 ft. Oil sands were found from 2,160-62 ft. The test is located in the F. E. Stearns Survey 184, approximately 11½ miles southwest of Freer.

A new Wilcox discovery in Duval County continues to test after flowing gas on drill-stem test. Delhi Oil Corp. 2 Hagist Ranch, 11 miles north of Freer, flowed gas on drill-stem test through perforations at 7,123-75 ft. Tubing pressure was 1,900 psi, and pressure on surface casing built up to 1,500 psi. before the well was killed and squeezed.

Southern Minerals Corp. 1 Cora L. Hunt, San Patricio County wildcat, recovered 3 ft. of sand with slight gas odor on core at 6,175-80 ft. A drill-stem test was made at this interval and recovery was 60 ft. of gas-cut mud through ¼ and ⅜-in. chokes with bottom-hole flowing pressure at 60 psi. Core at 6,180-87 ft. recovered 1 ft. of soft shaly sand, no shows, and drill-stem test was made at 6,177½-87 ft. Recovery was 160 ft. of gas-cut mud, 30 ft. of salt water with no working pressure. Coring operations will continue.

Rowan & Hope have completed the 1 H. M. Roark, discovery in J. M. Hernandez Survey 34, Abstract 225, McMullen County, for 61 bbl. of 38°-gravity oil per day through ⅛-in. choke. Total depth of the well is 5,792 ft. and production is through perforations at 5,090-5,110 ft. with 675 psi. pressure on the tubing.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Kleberg County: Gas discovery—Humble Oil & Refining Co. G-1 King Ranch-East Laureles, Rincon de los Laureles Grant, 16 mi. south of Corpus Christi, top sand 6,497 ft., TD 12,005 ft., perf. 6,497-6,505 ft., IP 35,000 M c.f. gas per day on open flow, SIP 2,622 ft.

McMullen County: New oil pool—Rowan & Hope 1 H. M. Roark J. M. Hernandez Sur. 34, A-225, 8 mi. N of Tilden, top sand 5,088 ft., TD 5,792 ft., perf. 5,090-5,110 ft., IP 61 bbl. oil per day, ⅛-in. choke, GOR 627, TP 675 psi., 38° grav.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Duval County: H. L. Bedwell 1 Lucille Gruy Est., Sur. 168, 20 mi. S of Freer, dry, TD 2,588 ft.

Milam County: Byrd Oil Corp. & C. W. Voyles 1 Lucinda Greene, W. D. Thompson Sur., 3 mi. W of Gause and 8 mi. NE of Milano, dry, TD 5,735 ft.

Nueces County: M. F. Morgan 1 J. L. Cody, F. Z. Bishop subd. of the Petronilla Ranch, 9 mi. E of Bishop, dry, TD 6,130 ft.

Webb County: O. W. Killam 2 Bruni Est., Sur. 129, 4½ mi. SW of Bruni, dry, TD 4,067 ft.

Willacy County: Orrin W. Johnson, Trustee 1 Orrin W. Johnson, Tr., Block 14, Sec. 11, 7 mi. NE of Lyford, dry, TD 7,522 ft.

CALIFORNIA

New Pool Accumulation Found in Four Deer Field

LOS ANGELES.—A well originally started as a development of the Four Deer Field in Santa Barbara has made a new pool discovery. The well, 13 Los Flores, of the Sunray Oil Corp., was plugged and redrilled after reaching a depth of 6,020 ft. On redrilling the hole crossed the field boundary fault and picked up production in the Chert Zone. Initial production, 100 bbl. per day pumping, 30.4° gr., 2 per cent cut. Redrilled depth is 5,890 ft. The well is located in 9-8n-33w.

In San Luis Obispo County, C. W. Colgrove has brought in a test well, 43-5 McDonald, in the Arroyo Grande Area. After gun perforating at 3,015-2,988 ft. the well was completed on the pump for 125 bbl. per day, 15.3° gr. oil. Location is 5-32s-13e. TD 3,198 ft.

The Arroyo Grande is on the north flank of the Pismo syncline. The area has been the site of scattered discoveries since 1906. The new well carries the productive area west. A second Colgrove test in this area is drilling about a mile northeast of 43-5 McDonald at 33-31s-13e. The test is 45-33 Patchett and is drilling ahead at 1,870 ft.

At Signal Hill, Max Pray and Fred Morgan attempted production in their 2-A Johnson, 24-4s-13w, at 11,025 ft. This is below the De Soto Zone. First attempts were unsuccessful and the well is being plugged back to test an additional sand in the interval 10,600-10,800 ft. If this test fails to produce, the hole will be completed in the De Soto sand.

Shell Oil Co. 1 Baldwin Hills Comm., 9-2s-14w, deep test in the East Inglewood area, is undergoing tests. Present depth is 13,503 ft. The tests follow reaming of the hole.

CALIFORNIA SUCCESSFUL WILDCATS

San Luis Obispo County, Arroyo Grande Area: C. W. Colgrove, 43-5 McDonald, 5-32s-13e, on pump, 125 bbl. per day, 15.3° gr., 0.8 per cent cut, TD 3,198 ft., gun perforated 2,988-3,015 ft.

Santa Barbara County, Four Deer Area: Sunray Oil Co., 13 Los Flores, 9-8n-33w, on pump, 100 bbl. per day, 30.4° gr., 2 per cent cut, TD 6,020 ft. Drilled in Four Deer field, well crossed boundary fault and found production in Chert Zone. A new pool.

CALIFORNIA WILDCAT FAILURES

Fresno County, Cantua Creek Area: Continental Oil Co., 1 S.P., 25-17s-15e, dry, TD 10,342 ft., elev. 358 ft.

Kern County, Tejon Hills Area: Steele Petroleum Corp., 4 Anniversary, 10-11n-18w, dry, TD 1,396 ft., elev. unknown.

Tejon Hills Area: The Termo Co. No. 1, 29-11n-28w, dry, TD 950 ft., elev. unknown.

Los Angeles County, Placerita Area: Eclipse Oil Co., 1 Karen, 36-4n-16w, dry, TD 2,005 ft., elev. unknown.

San Luis Obispo County, Cuyama Valley Area: Kenneth A. Holmes, 1 Holmes 30-11n-27w, dry, 5453 ft., elev. 2,205 ft.

Santa Margarita Area: Humble Oil & Refining Co., A-9 Santa Margarita Land & Cattle Co. B-1, 9-32s-19e, dry, TD 2,680 ft., elev. 2,793 ft.

Ventura County, Shiells Canyon Area: T&T Oil Co. 1-A Hickler, 22-4n-19w, dry, TD 3,497 ft., redrilled to 3,468 ft., elev. 1,950 ft.

Somis Area: Humble Oil & Refining Co. 2 Berylwood Inv. Co., 32-3n-20w, dry, TD 6,744 ft., elev. 805 ft.

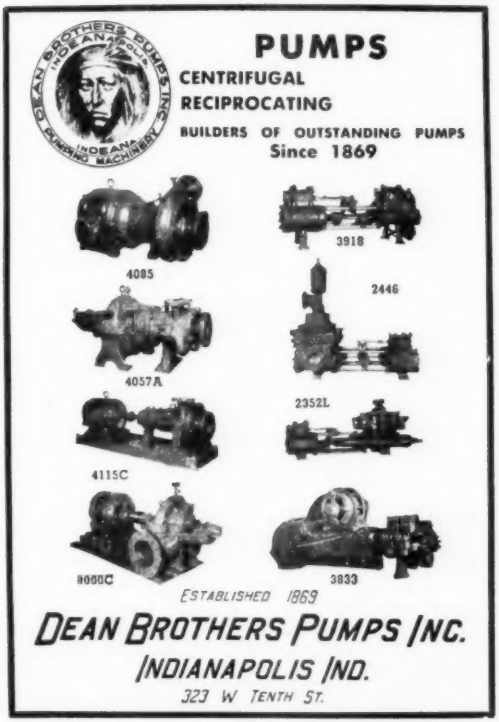
CANADIAN FIELDS

Joseph Lake Viking Pool Gets Second Oil Success

CALGARY.—The second oil success in Joseph Lake Viking sand pool, 20 miles southeast of Edmonton, has been placed on production with a flush yield of 30 bbl. of oil in 1 hour. The well, 2 Superior-Joseph Lake, LSD 14, 22-50-22w4, was completed in the Viking at 3,297 ft., and set 7-in. casing at 3,295 ft. On a later 24-hour flow test, oil recovery through a 14/64-in. choke amounted to 128 bbl. of 38.3° A.P.I. crude oil, with no sign of water. The 3 Superior-Joseph Lake, ¼ mile east of the discovery (No. 2 is ¼ mile north) is coring at 3,235 ft., nearing its expected Viking objective.

The 1 Pacific-Calahoo, wildcat in LSD 1, 32-55-26w4, is coring and testing in the upper Devonian at 4,111 ft. Latest tests in DI zone gave recoveries of mud and slightly gas-cut mud. Most encouraging

(Continued on page 142)



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APPALACHIAN FIELD

Good Shallow Gasser For Washington County

PITTSBURGH—An exceptionally good shallow sand gas well was brought in in Amwell Township, Washington County, Pennsylvania. Manufacturers Light & Heat Co. 1 John A. Hufford gaged 5,500,000 cu. ft. of gas, Fourth sand 2,950 ft., gas 2,972-88 ft., total depth 2,988 ft. Two wildcat wells are under way in Cambria County. In Croyle Township, Peoples Natural Gas Co. 1-3878 Joseph Gavany, 381 ft. is fishing; in Elder Township, its 2-3890 Clearfield Bituminous Coal Co., has rig completed. In Wharton Township, Fayette County, William E. Snee et al 3 Indian Creek Coal & Coke Co. at a depth of 6,636 ft. encountered a fishing job. Tools have been recovered and fishing operations are now on the wire line.

Twelve new locations were reported in Southwest Pennsylvania: Boggs and North Buffalo townships, Armstrong County; Croyle and Elder townships, Cambria County; Limestone and Piney townships, Clarion County; Morgan Township, Greene County; Clover Township, Jefferson County; Amwell and East Pike Run townships, Washington County; and Loyalhanna Township, Westmoreland County.

In Glade district, Webster County, West Virginia, Hope Natural Gas Co. 9227 West Virginia & Pittsburgh Railroad Co., elevation 2,512 ft., drilled through the Oriskany sand, reaching the bottom at 7,374 ft., with a show of salt water at 7,300 ft. Drilling is continuing and is at a depth of 7,419 ft. In Elk district, Kanawha County, A. C. Radford 1 Virginia F. Work, Corniferous lime 4,916 ft., Oriskany sand 5,047 ft., with a show of gas and hole full of water at 5,055 ft., will be plugged and abandoned; total depth 5,061 ft. A good shallow sand gas well was noted in Harts Creek district, Lincoln County, United Fuel Gas Co. 6466 G. Lambert, which gaged 1,555,000 cu. ft. in the Brown shale; total depth 3,790 ft.

Sixteen new locations were reported in West Virginia: Lee district, Calhoun County; DeKalb district, Gilmer County; Ravenswood and Ripley districts, Jackson County; Lafayette and McKim districts, Pleasants County; Portland district, Preston County; Marsh Fork and Trap Hill districts, Raleigh County; Harper and Spencer districts, Roane County; Union district, Tyler County; Union district, Wayne County; and Burning Springs district, Wirt County.

LA.-ARK.

Union Test Gets Formation Top at 7,605 Ft.

SHREVEPORT—Union Producing Co. 1 Section 13 Unit, 13-17n-12w, Cotton Valley exploration in Sligo field of Bossier Parish, reported top of that formation at 7,605 ft., based on driller's samples. Elevation is 214 ft. Cores from 7,800-7,900 ft. recovered lime and shale with no shows, and operators were reaming the hole at 7,890 ft.

C. H. Murphy 1 Crystal Oil & Refining Corp., 14-21n-12w, was drilling below 7,028 ft.

C. H. Murphy 1 Meredith, Caldwell Parish wildcat 2 miles north of Columbia, was drilling at 5,872 ft., in the Tuscaloosa topped at 5,265 ft., by samples. Cores from 5,270 ft. had salty sand and shale with no shows.

It Catahoula Parish, Interstate Natural Gas Co. 1 Tensas Delta, 11-9n-7e, was reported running 5½-in. casing. Total depth was 8,521 ft., in the Tuscaloosa topped around 7,860 ft.

Marine Oil Co. 1 Farrar, NE SW 19-5n-6e, 7 miles northeast of Saline Lake field, had total depth of 6,023 ft., in the Wilcox topped at 4,086 ft. by survey. A 5 ft. core at 5,287-94 ft. had 1 ft. of sand with show of oil, and 5 ft. of sandy shale. Sixty sidewall cores at 5,280, 5,854, and 5,864 ft. had light shows of oil. Five-inch casing was set at 6,023 ft. and operators prepared to perforate.

Ohio Oil Co. and others 1 O. L. Martin, 3-22n-7w, Claiborne Parish, cored sand, shale, and siltstone with no shows, from 7,945-8,044 ft., and continued drilling below 8,148 ft.

In East Carroll Parish, Peterson Drilling Co. 1 Levi, Irregular Section 51-18n-13e, was drilling in the upper Glen Rose at 3,842 ft. It is a new 4,000-ft. wildcat, 2½ miles east of Sondheimer.

Nebo Oil Co. 1 LaSalle Land Co., 15-15n-4e, spudded and was drilling at 3,749 ft., on a 5,000-ft. contract. Location is on a seismograph prospect, 2 miles east of Bosco, in Ouachita Parish.

Union Oil Co. of California 1 Ferguson, Sabine Parish wildcat in 11-7n-11w, was coring the upper Glen Rose at 6,213 ft., with no shows.

In Tensas Parish, Peterson Drilling Co. 1 H. C. McKinney, NW SW 11-13n-10e, cored 1½ ft. of sand with slight oil shows from 7,523-28 ft., then drill-stem tested at 7,514-28 ft., with 1,000 ft. of water cushion. In 51 minutes recovery was 120 ft. of oil and gas-cut mud. A core from 7,528-44 ft. recovered tight, ashy sand with light oil shows, salty at the base. It was drilling ahead at 7,676 ft.

I nLittle River County, Arkansas, Lee & Burnett 1-C Sivley, 35-12s-31w, was coring in the Travis Peak at 3,230 ft.

Garland Anthony 1 E. A. Price, 18-16s-25w, outpost to Cypress Lake field, Miller County, was waiting on cement after setting surface casing.

Victor Grace 2 Southern Co., 4-16s-14w, Union County, was drilling below 5,001 ft., with no shows reported.

Jones & O'Brien, Inc., 1 Union Saw Mill,

THE OIL AND GAS JOURNAL

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Foreign: D. T. O'Connor, 500 Fifth Ave., New York, N.Y.; United Oil Well Service, Caracas, Venezuela; Denton-Spencer Co., Ltd., Calgary, Alberta, Can.

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A pioneer plant, in commercial operation for over a year, already has demonstrated high dependability, with exceedingly low production and maintenance cost.

From an operating standpoint it is thought that the most desirable tonnage requirements for the new type of mill will lie between 50,000 and 75,000 tons per year. With the addition of more welding units, the production may easily be raised to 125,000 tons.

Initial investment, maintenance and operating cost are so low that profitable operation under favorable circumstances may be maintained *on a production as low as 15,000 tons per year, or even less.*

Notable features of the new process are: Exceedingly low scrap loss and tooling cost; wide range of sizes which can be produced in the same mill, with one basic set of tooling; short set-up time for different sizes; small amount of operating skill required. (Low scrap loss is especially important with operators not producing their own steel plate.)

Biggest single consideration, however, for production within the limits mentioned, in most cases will be low initial investment in plant equipment—only a small fraction of that necessary with any of the older processes of pipe making.

Where greater production is required, Yoder electric-weld Tube Mills, now as in the past, remain the most efficient and economical for sizes from ⅜" up to 12" O.D., or larger.

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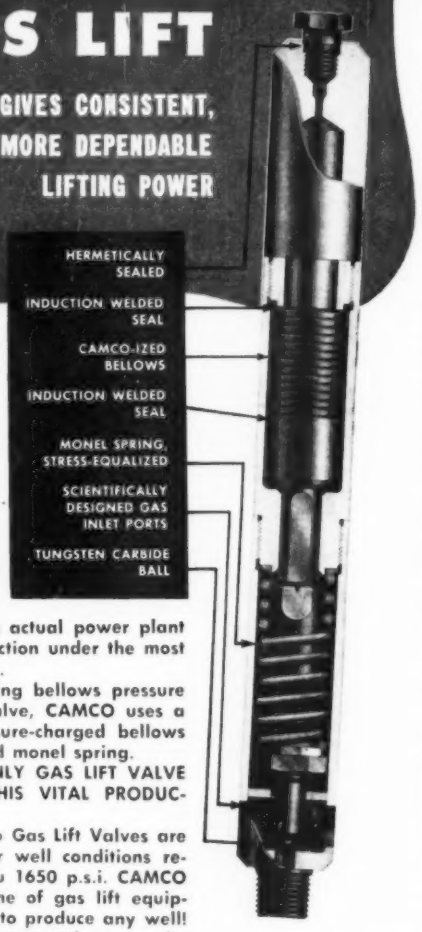

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GAS LIFT EQUIPMENT AND SERVICE

19-18s-12w, Union County, was in the lower Cretaceous at 3,417 ft. It is a new Smackover test 2 miles northwest of Strong.

NORTH LOUISIANA WILDCAT FAILURE

Morehouse Parish: Delta Drilling Co. 1 Crossett Lumber Co., NW NE 31-23n-6e, dry, TD 6,264 ft., Smackover 6,159 ft., elevation 131 ft.

ARKANSAS WILDCAT FAILURES

Miller County: Plains Production Co. 1 B Stricklin, NW SW SE 33-14s-27w, dry, TD 6,228 ft., Saratoga 1,062 ft., Massive anhydrite 3,340-3,457 ft., James 3,855 ft., Cotton Valley 5,725 ft., Smackover 5,995 ft., elevation 267 ft.

H. C. Taylor 1 Dickerman, SE SE SE 8-17s-28w, dry, TD 1,606 ft., Arkadelphia 1,150 ft., Nacatoch sand 1,346 ft., Saratoga 1,582 ft., elevation 245 ft., no shows.

ROCKY MOUNTAIN

Two Montana Tests Look Promising

DENVER—Two wildcats of interest in Montana showed saturation in cores and may be commercial discoveries. The Texas Co. recovered 123 ft. of 33.5°-gravity oil and 27 ft. of drilling mud at 1 N.P.R.R. "E," NE NE NE 5-9n-34e, on Sumatra anticline, between Ingomar and Ragged Point, Rosebud County, Montana. The test was made of Amsden, topped at 4,338 ft. On a subsequent test between 4,392-4,401 ft. the well made 119 ft. of oil and 31 ft. of drilling mud in 1 hour. Texas is drilling ahead for a Madison and possibly Big Snowy group test. General Petroleum Corp. at its Collins area wildcat at 8-12-P, SW SW SW 12-24n-2w, Teton County, Montana found Madison saturation at a shallow depth. Top of Madison was found at 1,572 ft. and cores showed some saturation. However, on drill-stem test 1,570-88 ft. the well made only 90 ft. of drilling mud in 1 hour. The well is 4 miles southeast of a recent Devonian failure drilled by British-American Oil Producing Co. and the present well is also scheduled to test Devanian. General Petroleum last week suspended operations on its Agawam wildcat, 20 miles northwest of Collins, after tests of shows in the Madison failed to be commercial.

Discovery of oil in the Tensleep was made by Farmers Union Central Exchange, Inc., at 1 Shad, SE SE SE 6-43n-91w, Murphy dome, Hot Springs County, Wyoming. Top of Tensleep was found at 4,385 ft. and on drill-stem test at 4,385-4,405 ft. the well made 2,675 ft. of 34°-gravity oil in 1 hour. On a subsequent test at 4,385-4,432 ft. the well had a strong blow of gas and 1,800 ft. of oil was recovered in 15 minutes. The operator is now drilling below 4,528 ft. to test Madison. Murphy dome is a known surface structure and the well is just 1,320 ft. from a Tensleep test drilled in 1945 which was 170 ft. lower structurally and carried water. The new discovery will undoubtedly cause additional study of known nonproductive structures in the southeastern part of the Big Horn Basin.

Reported shows of oil at Pure Oil Co.'s Badwater wildcat, SE NE NW 35-39n-89w, Natrona County, Wyoming, were considered of little importance by company geologists who said the shows were from thin sand stringers possibly in upper Mesa Verde formation. The shows were encountered at 9,160 ft. but a core taken between 9,166-73 ft. reportedly showed sandy shale and no shows of oil or gas. The operator is drilling ahead with the well projected as a deep test, possibly to Lower Cretaceous sands.

WYOMING SUCCESSFUL WILDCATS

Lightning Creek, Niobrara County: Atlantic Refining Co. 1 State "36," NE NW NW 36-35n-66w, 3,991 ft. TD, pumped 297

bbl. oil per day from perf. 3,870-90 ft. (60 shots), Frontier 1,727 ft., Muddy 2,507 ft., Dakota 3,060 ft., Fuson 3,205 ft., Lakota 3,230 ft., Morrison 3,362 ft., Sundance 3,560 ft., basal Sundance 3,872 ft. Basal Sundance discovery, new field.

South Frisby, Washakie County: General Petroleum Corp. 37-X-24-G, NW SE SW 24-47n-92w, 10,665 ft. TD, pumped 81 bbl. oil per day, 32.5 -gravity oil after acid with total of 18,000 gal., Frontier formation 7,350 ft., first Frontier sand 7,675 ft., second Frontier sand 1,790 ft., third Frontier sand 7,950 ft., Muddy 8,650 ft., Dakota sand 8,925 ft., Morrison 8,980 ft., Sundance 9,260 ft., Gypsum Springs 9,618 ft., Chugwater 9,665 ft., Dinwoody 10,525 ft., Phosphoria 10,575 ft. Phosphoria discovery, new field.

SOUTH DAKOTA WILDCAT FAILURE

Piedmont area, Meade County: E. B. Kucera 1 Fee, C SE SW 19-3n-7e, 1,370 ft. TD, PB 802 ft., plugged and abandoned. Chugwater 305 ft., Spearfish 415 ft., Minnelusa 912 ft., first Leo 1,358 ft.

ILLINOIS

North Boos Area Extended By 20-Bbl. Per Hour Well

MATTOON—W. E. Weidler and Paul Bergbower, E½ NE NW 4-6n-10e, west of the North Boos area at the north end of the Clay City-Noble Consolidated pool, in Jasper County, flowed 80 bbl. of clean oil in the first 4 hours in initial tests of McClosky lime found at 2,755-80 ft., and is proving one of the best wells in the area. Pay zone was treated with 5,000 gal. of acid prior to the test.

The same operator's 1 Boudeman, NW NW SW 14-4n-10e, a ¾ mile extension for the Olney pool, 4 miles north of Olney, Richland County, is flowing by heads 10 to 15 bbl. of clean oil per hour from McClosky lime at 3,020-23 ft. Pay as yet has not been acidized nor shot.

More than a mile northwest of production of the West Goldengate pool in Wayne County, C. J. Meyer found good oil showings in Aux Vases sand at 3,244-60 ft. in his 1 Spriggs, NW NE SE 31-1s-8e, and has run 5½-in. casing to 3,259 ft. to test.

George & Wrather and Walter Duncan 1 Alica Laswell, SW NE SW 18-7s-5e, prospective new pool opener in the extreme southwest corner of Hamilton County, and about a mile northwest of the West End pool on the Hamilton-Saline County line, swabbed 2 bbl. of oil with about 40 bbl. of water in 4 hours while starting tests of McClosky lime, in which casing was perforated at 3,273-79 ft.

ILLINOIS SUCCESSFUL WILDCATS

Franklin County: Carter Oil Co. 1 Trustee Tract 8, SW NW NE 12-7s-4e, IP 254 bbl., Aux Vases 3,148-58 ft., TD 3,158 ft. (Opens new pool).

Randolph County: Kleiboecker-Smitzmeyer 2 McMillon heirs, NW NE SE 7-5s-5w, IP 1 bbl., Cypress 880-88 ft., TD 900 ft. (Extension Sparta pool).

ILLINOIS WILDCAT FAILURES

Clark County: Hoosier Drilling Co. 1 Wernz, C SW SW 12-9n-12w, dry, TD 2,767 ft.

Coles County: Georgt Zicos et al., 2 Fender, NE NE NE 17-12n-14w, dry, TD 499 ft.

Edgar County: Gray-Phillips 1 Whisnand, NE NW NW 10-13n-14w, dry, TD 425 ft.

Jones & Simpson 1 Inerry, NE SW NE 14-14n-13w, dry, TD 1,054 ft.

Ryan Oil Co. 1 Swank, SW NW NW 6-12n-10w, dry, TD 955 ft.

Madison County: O. C. Myers 2 Linenbroker, SW NE NE 32-6n-6w, dry, TD 582 ft.

Richland County: J. W. Sanders 1 Blank, SE SE SW 4-4n-14w, dry, TD 3,095 ft.

F-B Drilling Co. 1 Berryhill, SE SW SE 32-4n-14w, dry, TD 3,235 ft.

Sabine County: M. E. Affeld 1 Hunsaker, NE NW SW 33-7s-7e, dry, TD 2,962 ft.

PERMIAN BASIN

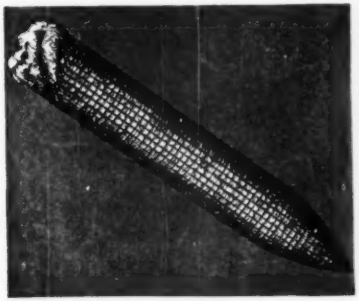
SE End N. Snyder Field Gets High Well

MIDLAND—One location east of W. A. Moncrief 1 Huckabee, recent southeast extension well to the North Snyder field, Scurry County, Castleman & O'Neill, J. R. Hunter and Walter Duncan 1 H. C. Huckabee, Section 160, had corrected top on the Canyon lime at 6,174 ft., minus 3,750 ft., after running electrical surveys. That top makes it 506 ft. high structurally to the Moncrief well.

Top of the pay was 6,177 ft., as it was reported to have logged 657 ft. of oil-bearing section in drilling to 6,834 ft. At last report operators had set 5½-in. casing to 6,440 ft. and were preparing to complete from open hole. Drilling reports indicated the well blew out when drilling at 6,180 ft., blowing from 10-20 bbl. of oil an hour over the derrick for 4 hours. The same operators made location for their 2 Huckabee, one location farther east.

On the northwest edge of the North Snyder producing area, Humble Oil & Refining Co. 2 L. N. Perriman, SE NE 438-97-H&TC, had top of the reef at 6,950 ft., on an elevation of 2,563 ft., which made it some 40 ft. high to the same company's 1 Perriman according to some geologists. The 2 Perriman had total depth at 7,060 ft. and was running electrical surveys before setting casing for production tests.

Mitchell County,—Standard Oil Co. of Texas 1 Dunn, NW SW 64-20-Lavaca Navigation Survey, 5 miles east of Vincent, flowed oil and water on a drill-stem test of the Pennsylvanian at 7,565-7,685 ft. Full details on the 5-hour test were not disclosed



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Gas was said to have surfaced in 5 minutes, with drilling mud flowing in 10 minutes and oil in 15 minutes. It was cleaned into pits for 1 hour and then turned into tanks. A 60-minute period gaged some 60 bbl. of fluid, said to be 70 per cent oil and the balance water. Formation water was believed to be coming from a faulty plug at 7,685 ft. Field reports carried the following formation tops: Canyon reef 7,380 ft., Mississippian 8,160 ft., and Ellenburger at 8,305 ft., on an elevation of 2,249 ft. At last report operations were delayed for repairs due to fire damage.

Gaines County.—Magnolia Petroleum Co. completed its 1 Flanagan Estate, SW NW 9-A23-PSL, from both the Clearfork and Devonian. Location of the well is an east offset to Shell Oil Co. 1 Hawkins, discovery well in the Ellenburger.

The 1 Flanagan flowed 404 bbl. of 39.5-gravity oil, without acid, in 24 hours from Clearfork pay at 7,228-50 ft. The flow was through ½-in. choke, with gas-oil ratio of 773 cu. ft., and casing pressure of 790-740 psi. Top of Devonian pay was 10,345 ft., which rated a natural completion of 537 bbl. of 34-gravity oil a day, with very little gas, and with tubing pressure at 560 psi., down to 20 psi. at the end of the 24-hour test. Total depth was 12,255 ft., in Ellenburger topped at 12,240 ft., and plugged back to 10,404.

Upton County.—Republic Natural Gas Co. 1 V. J. Powell, 44-40-T4S-T&P, 2 miles southwest of the Pegasus Ellenburger field, unloaded oil for 45 minutes while pulling drill pipe, following a drill-stem test in the Ellenburger at 12,945-13,019 ft.

When the tool was opened, gas showed at the surface in 16 minutes. After 50 dry stands of pipe had been pulled, the well started unloading mud, continuing for 10 minutes, after which it flowed oil while the remainder of pipe was pulled.

Midland County.—Magnolia Petroleum Co.'s 2-30 Roy Glass, northeast stepout to the Pegasus field, entered the Ellenburger at 12,611 ft., minus 9,718 ft., which was correlated 78 ft. low to the same firm's 1-A-TXL. However, its prospects were better when an attempted drill-stem test from 12,613-661 ft. showed gas in 7 minutes and recovered 405 ft. of 49.9-gravity oil, 540 ft. of heavily oil and gas-cut mud, and 3,040 ft. of drilling mud. Mechanical trouble cut the test off after 65 minutes. It was drilling ahead below 12,692 ft.

Pecos County.—Fullerton Oil Co., Callery and Hurt, and others 1-D Kone, Ellenburger prospect in the Pecos Valley field, found additional pay in drilling to 8,088 ft. On a production test from 8,058-88 ft. it was swabbed in and flowed an estimated 30 bbl. of clean oil an hour, with no water. The test was to continue for 16 hours, then drill deeper.

Winkler County.—Gulf Oil Corp. 146-E Keystone, 24-A57-PSL, northwest offset to the Flying W Devonian discovery, recovered 120 ft. of clean oil on a drill-stem test in top of the Ellenburger from 11,790-827 ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Coke County: Humble Oil & Refining Co. 2 Sallie Odom, Felix Sosa Sur. 302, 2¾ mi. NW No. 1 discovery (Runnels County), dry, TD 6,374 ft., Strawn 5,090 ft., Ellenburger 5,680 ft., Cambrian 6,316 ft., elev. 2,041 ft., Strawn perf. yielded 160 bbl. of fluid, 5 per cent oil.

Kimble County: George W. Strake 1 R. R. Spiller, Kimble CSL Sur. 751, A-811, 8 mi. NW Junction, 6 mi. NE Bolt field, dry, TD 2,356 ft.

Pecos County: Hunt Oil Co. 6 Elsinore Royalty Co., 31-C-GC&SF, dry, TD 1,340 ft.

Reagan County: J. C. Ratliff, Jr., et al 1-A University-Atlantic, 18-48-University Lands, 11 mi. SE Big Lake, dry, TD 2,395 ft., show of gas in lime 2,119 ft., shot with nitro 2,248-2,365 ft., swabbed 4 bbl. oil and 2 bbl. water.

Schleicher County: L. W. Elliott 1 V. O. Tisdale, NW NW 16-A-HE&WT, old TD 3,142 ft., dry at new TD 6,000 ft.

Winkler County: Richardson & Bass 1 Joe

(Continued on page 141)

N. CENTRAL TEXAS

Parker County Test Makes Flowing Well

WICHITA FALLS.—Northeastern Parker County had a second oil discovery in prospect at Farris Oil Co. 1 W. J. D. Culwell, J. Herendon Survey, 2 miles west and 1 mile south of Springtown. The well was first reported as making only a small amount of gas, but after 500 gal. of acid in the Caddo from 3,565-3,625 ft., the well kicked off to flow an estimated 4-5 bbl. of oil an hour, with an estimated 3,000,000 cu. ft. of gas daily.

The well had been shut down at 4,002 ft. for several weeks, pending decision to test the Caddo or drill to the Ellenburger. When the hole was reentered, it was plugged back to 3,700 ft. Top of the Caddo was 3,620 ft. The pay section was to be mudded off and 7-in. casing run to 3,625 ft.

Two miles north of the Farris well, Buz Morgan 1 Darrell, O'Neal M. Waugh Survey, was delayed in making potential tests for the Ellenburger. At last report the well had produced 28 bbl. of oil and 28 bbl. of water from open hole at 6,662-85 ft.

Cooke County.—Britton, Fitzhugh & Powell 1 B. V. McCorkle, Roma Dye Survey, southeast extension, or new discovery, 1½ miles from production in the Woodbine field, completed on the pump for 147 bbl. of 42°-gravity oil a day, from Strawn pay at 4,514-22 ft.

Jones County.—American Trading & Production Corp. completed its 1 L. R. Stanley, 14-17-T&P, for a flowing potential of 453 bbl. of 44-gravity oil in 24 hours, from open hole in the Strawn at 4,586-4,610 ft. Location is a ½-mile extension to The Texas Co. 1 Merrit, discovery well which came in for 42 bbl. of oil in 10 hours. Top of pay in the Stanley well was 4,586 ft., with

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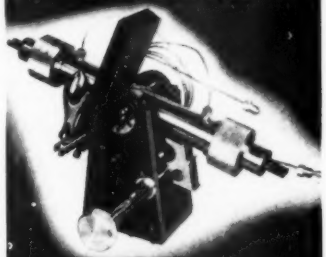

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Maxwell 2 Mrs. George Sparkman, S. Crooks total depth at 5,610 ft. Location is 3 miles east of Noodle.

Coleman County.—W. E. Stepp and L. J.

(Continued on page 141)

OHIO, KENTUCKY

Good Gas, Oil Showing In Knox County

COLUMBUS.—Ray Penick et al., 1 George Stitzline, Section 21, Jefferson Township, Knox County, is making a good showing of both oil and gas from the first and second Clinton sands, and will be shot before completing. This newer oil production will probably connect with an older gas pool a mile to the north.

In Perryton pool, Kinsey & Mossholder 5 William Hoover, Section 1, Perry Township, Licking County, made 45 bbl. after shot from the Clinton at 2,893-2,912 ft. In the east part of the pool, Frank Brendel Oil & Gas Co. is getting a big well on 1 Alva J. Fairall, Section 7, Jackson Township, Muskingum County, which filled up 1,500 ft. while drilling in.

Clinton-sand gas production in the east side of Bethlehem Township, Stark County, which is now being actively drilled, was extended ½ mile farther to the west by Wiser Oil Hugo Wanner, Section 15. White sand was topped at 4,481 ft. with an open flow of 554,000 cu. ft. natural. After drilling through the sand, the well will be shot and tubed.

EASTERN KENTUCKY

ASHLAND.—An important new wildcat location has been made for the eastern Kentucky province. The well will be known as 1 Virgil Ramey and is being drilled by A. H. Carpenter on a farmout from the California Co. Test is located in 25-X-78 about 10 miles northwest of Grayson, the county seat, and is designed to test, at least, part of Knox dolomite sequence.

In Owsley County, 9-L-69, Petroleum Exploration Co. is drilling at 2,867 ft. on 1 B. Bottner a St. Peter-Knox exploratory well and the first such deep test for the county.

EASTERN KENTUCKY WILDCAT FAILURE

Lee County: Jack Kindred 1 C. J. Sipple, 19-N-69, dry, TD 3,384 ft., Corniferous 867 ft., Tyrone 2,178 ft., Knox 2,958 ft. water.

WESTERN KENTUCKY

OWENSBORO.—A new producing area about a mile south of the Spring Grove pool is believed to have been found at J. Sallee and T. Cooke 1 J. F. McKinney, 20-O-18, which, in drill-stem test of Cypress sand at 2,323-48 ft., recovered 65 ft. of clean oil and 100 ft. of oil-cut mud. About 50 ft. of salt water also was obtained. Hole is being deepened for a look at lower potentially productive horizons.

The recently opened West Glenville area in southern Daviess County is becoming one of the most active spots in the state. Three new completions were reported during the week with four additional wells being tested and four other operations drilling.

WESTERN KENTUCKY SUCCESSFUL WILDCATS

Union County: I. W. Hastman 1 V. Meredith, NE SW NE 11-P-28, IP 30 bbl., Cypress 2,308-29 ft., TD 2,796 ft. (Opens new pool).

Sinclair Oil & Gas Co. 1 F. C. Hite, SW NE NE 13-P-20, IP 180 bbl., O'Hara 2,524-27 ft., TD 2,530 ft. (Opens new pool).

WESTERN KENTUCKY WILDCAT FAILURE

Daviess County: F. M. Ashby 1 A. H. Hill, NW SE NW 15-O-32, dry, TD 1,208 ft.

INDIANA

EVANSVILLE.—C. E. Skiles 1 Vogel-Spencer, NE NW NW 14-8s-14w, ¾ mile southwest of production of the Spencer pool, 8 miles southwest of Mount Vernon, southern Posey County, flowed 4 bbl. of clean oil natural per hour to establish a major extension to this steadily expanding prolific area. The well has the McClosky pay at 2,883-86 ft., approximately the same depth at which it is found in the pool proper. Drilling already is getting under way for a west offset, 1 Spencer-Vogel Community, NE NE NE 15-8s-14w.

J. E. Bauer 4 Brevoort, SW NE NW 27-2n-11w, westward extension for the St. Thomas pool, Knox County, pumped 35 bbl. per day from Benoist sand at 1,767-87 ft., after plugging back from the McClosky lime at 1,912-21 ft., where production also has been indicated. The Benoist sand was given a 40-qt. nitro shot.

INDIANA SUCCESSFUL WILDCAT

Knox County: J. E. Bauer 4 J. N. & E. Brevoort, SW NE NW 27-2n-11w, IP 15 bbl. Benoist 1,778-84 ft., TD 1,950 ft. (Extension St. Thomas pool).

INDIANA WILDCAT FAILURES

Daviess County: D. R. Snyder 1 Sprinkle, NE SW SE 26-5n-7w, dry, TD 928 ft.

Gibson County: Aurora Gasoline Co.-N. V. Duncan 1 Curtice, NW SW NE 15-2s-10w, dry, TD 2,105 ft.

Evans & Dobbs 1 Welborn, SW SW SW 22-2s-11w, dry, TD 2,348 ft.

Sullivan County: J. A. McDonell and O. A. Thayer 1 Snyder, NE SW NW 27-2n-9w, dry, TD 2,620 ft.

F. B. Cline 1 B. A. Pogue, SW SE SE 20-9n-10w, dry, TD 2,548 ft.

Vanderburgh County: B. M. Heath et al., 1 Zimmerman, NW NE NE 27-7s-11w, dry, TD 948 ft.

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Completions Maintained at High Level Outside Appalachian Area

by Polly DeArmond

AUGUST well completions totaled 3,321 against 3,497 in the same month last year, a drop of 5 per cent. Excluding the Appalachian area of New York, Pennsylvania, and West Virginia gives a different picture. In the remaining states total completions were 3,058 this year against 3,007 in 1948, an increase of almost 2 per cent.

Total completions for the first 8 months were 24,993 this year against 25,187 in 1948, a drop of less than 1 per cent. Again excluding the three Appalachian states gives a different picture. With these out, the 8-month totals are 22,779 wells this year against 21,711 in 1948, an increase of 1,068 wells or about 5 per cent.

Total footage drilled in August this year was 11,456,418, a decrease of 532,811 ft. from August 1948, or about ½ per cent. Excluding the three Appalachian states, the figures are 10,990,928 ft. this year against 11,149,856 ft. in 1948, a decrease of about 1 per cent.

Index of Drilling Efficiency

August makes a good month to arrive at an indirect index to the increased efficiency in rotary drilling. The number of active rotary rigs was fairly steady from week to week. Excluding the three Appalachian states leaves an area in which rotary drilling dominates the total picture. Dividing the total footage of completed wells by the average number of rotary rigs in operation during the month ought to give a rough index of rotary rig drilling efficiency.

Total August 1949 footage of roundly 10,991,000 ft. divided by 1,947 active rotary rigs gives an average per rig of 5,645 ft. The comparable figures for 1948 and 1947 are 4,854 and 4,424 ft. In these years the footage figures were roundly 11,150,000 ft. for 1948 and 8,539,000 ft. for 1947, while the active rigs figures were 2,297 and 1,930 respectively.

These index figures of 4,424, 4,854, and 5,645 ft. per rig, if valid, indicate an astonishing increase in drilling efficiency for such a short time.

A noticeable trend toward shallower drilling in the North Central states of Ohio, Kentucky, Michigan, Indiana, and Illinois resulted in a 7 per cent gain in completions for August this year compared to August 1948, but a drop of 7 per cent in footage drilled.

Mid-Continent Shows Increase

Two areas, Oklahoma-Kansas and Texas-New Mexico, had increases of 5 per cent in completions and 1 per cent in footage for August 1949 vs 1948. For Oklahoma-Kansas the completions were 733 vs. 702 and footage 2,470,023 vs. 2,434,040. For Texas-New Mexico the completions were 1,069 vs. 1,021 and footage 4,431,890 vs 4,381,902.

The southeastern area of Arkansas-Louisiana, Mississippi et al had 265 completions vs. 269 for August 1948, and 1,360,353 vs. 1,385,619 ft., a decrease of 2 per cent in both wells and footage. Reflecting the effect of fuel-oil prices on its market for black oil, Rocky Mountain completions in August were 93 vs. 120 last year, and the respective footages were 368,892 vs. 474,787 ft.

SUMMARY OF COMPLETIONS, AUGUST 1949

	Total comp	Oil	Gas	Dry	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	10,000-12,500 ft.	Over 12,500 ft.	Total footage	Rigs and drilling
New York	53	27	0	26	53	0	0	0	0	0	75,622	114
Pennsylvania	172	86	21	65	157	14	0	1	0	0	287,786	229
West Virginia	38	4	25	9	20	17	1	0	0	0	102,082	124
Ohio	99	29	33	37	62	37	0	0	0	0	151,502	148
Indiana	132	60	4	68	118	14	0	0	0	0	222,850	116
Kentucky	91	32	11	48	72	19	0	0	0	0	154,434	74
Illinois	251	116	0	135	117	134	0	0	0	0	597,197	264
Michigan	105	43	1	61	77	28	0	0	0	0	217,484	152
Kansas	313	165	50	98	41	269	3	0	0	0	993,011	415
Neb., Mo., Iowa	2	0	0	2	0	2	0	0	0	0	9,077	11
Oklahoma	418	232	22	164	142	190	63	13	10	0	1,467,935	576
Texas	1,035	663	50	322	310	389	251	60	25	0	4,253,148	1,295
North	224	148	0	76	130	62	32	0	0	0	608,940	150
West Central	142	77	2	63	67	56	19	0	0	0	410,188	184
West	245	216	1	28	47	91	80	19	8	0	1,185,713	417
Panhandle	47	37	8	2	4	41	0	2	0	0	151,827	128
East	84	55	3	26	4	58	18	4	0	0	369,302	78
Gulf Coast	172	84	23	65	21	48	63	26	14	0	996,633	181
Southwest	121	46	13	62	37	33	39	9	3	0	530,545	157
Louisiana	206	136	18	52	107	15	24	30	26	4	1,016,747	231
Northern	143	93	18	32	107	13	16	5	2	0	408,261	93
Southern	63	43	0	20	0	2	8	25	24	4	608,486	138
Arkansas	26	9	0	17	3	16	2	5	0	0	116,574	40
Mississippi	26	12	0	14	0	2	18	3	3	0	117,159	25
Ala., Ga., Fla.	7	1	0	6	0	3	1	1	2	0	49,873	3
Montana	30	14	3	13	19	11	0	0	0	0	63,692	76
Wyoming	53	24	1	28	10	31	6	1	4	1	249,463	§134
Colorado	6	2	0	4	0	1	5	0	0	0	36,296	23
Utah	4	1	0	3	0	3	1	0	0	0	19,441	22
New Mexico	34	25	3	6	3	17	5	7	2	0	178,742	138
California	220	159	3	58	63	79	39	20	13	6	1,016,303	184
Total August 1949	3,321	†1,840	245	*1,236	1,374	1,291	419	141	85	11	11,456,418	‡4,394
Total July 1949	3,153	1,731	242	1,180	1,241	1,289	403	141	69	10	10,962,121	4,586
Total August 1948	3,497	1,957	251	1,289	1,365	1,411	437	199	85	87	11,989,229	
Cumulative, 1949	24,993	14,036	1,795	9,162	9,420	10,279	3,220	1,358	629	613	89,590,935	
Cumulative, 1948	25,187	14,385	1,837	8,965	9,924	10,319	2,960	1,371			86,735,477	

*Incl. service wells: N.Y. 26, Pa. 58, Ohio 5. †Incl. 26 distillate wells: Okla. 3, W. Tex. 4, E. Tex. 2, Tex. Gulf 5, No. La. 2, So. La. 9, Miss. 1. ‡Incl. all wells rigged up and/or drilling at end of month. §Incl. 7 Dakotas.

1,000-Mile Oil Change Essential, Clark Says

CHICAGO.—Recent research has put the oil industry in a position to prove unequivocally that the economics of the 1,000-mile oil-drain period are so substantial that failure to follow it represents simply wasteful, uneconomical practice, it was declared here September 26 by Dayton P. Clark, chairman of the American Petroleum Institute lubrication committee, addressing the annual meeting of the Independent Oil Compounders Association.

Exhaustive road tests on engine lubrication conducted independently by Gulf Research & Development Co. and Standard Oil Development Co., Clark reported, "conclusively demonstrate the economical advantage of the 1,000-mile oil drain."

"Our problem now," he continued, "becomes one of presenting the main conclusions of these tests to the public. These studies bring out certain facts-of-engine-life so strikingly that we can proceed at once to present them as the backbone of our proof of the economy of the 1,000-mile oil drain."

"These facts," he said, "should prove conclusively to the average motorist that he is buying longer life and greater resale value for his car when he follows the A.P.I.-recommended oil-drain period. They should prove to him that as he extends his oil-drain interval he pays an increasingly higher price in engine inefficiency, breakdown, and loss on investment.

"They go on to prove that the supposed 'economy' of longer-interval crankcase change is very much less than supposed. This is because, as the oil-drain period is extended, the engine requires more make-up oil. So much additional make-up oil is used at longer drain intervals that oil savings drop literally to a matter of cents per month."

Program Completed for Tyler N.G.A.A. Meeting

Program has been completed for the southern regional meeting of Natural Gasoline Association of America, which will be held in Tyler, Tex., Friday, October 14. Practical problems in the operation of gasoline plants will provide the principal topics of discussion at the meeting.

Among featured papers will be a report of an industry survey on "Explosions in Air-Starting Systems," by Paul Lindeman, Phillips Petroleum Co., Bartlesville, Okla. John H. Naschke, Humble Oil & Refining Co., Houston, will present a paper on gasoline-plant corrosion.

The complete list of papers and authors follows:

"Corrosion in Gasoline Plants," by John H. Naschke, Humble Oil & Refining Co., Houston; "Compressor Lubrication and Packing Problems," by E. H. Flaherty, Clark Brothers Co., Olean, N. Y.; "Relation of Personnel to Plant Efficiency," by M. V. Cousins, United Gas Co., Shreveport; "Operation and Maintenance of Cooling Towers," by J. B. Baird, Hudson Engineering Co., Houston.

"Free Men Forging Their Own Chains," James E. Pew, Sun Oil Co., Philadelphia, N.G.A.A. president; "Some Practical Considerations in Gasoline-Plant Instrumentation," by C. F. Woods, Brown Instrument Division, Minneapolis-Honeywell Regulator Co., Dallas; "Explosions in Air-Starting Systems," by Paul Lindeman, Phillips Petroleum Co., Bartlesville, Okla.; "The Automotive Engineer Starts a Chain of Events," by B. R. Carney, Warren Petroleum Corp., Tulsa.

Directors Approve Shell Oil Reorganization Plan

The board of directors of Shell Union Oil Corp. last week voted approval of a plan to acquire as of September 30 all assets of its wholly owned operating subsidiary, Shell Oil Co., Inc., which was announced previously *(The Oil and Gas Journal, September 1, 1949, page 28)*. Shell Oil Co., Inc., will then be dissolved and from October 1 will be known as Shell Oil Co.

H. S. M. Burns was elected president and a director of the newly consolidated company; Alexander Fraser, former president, was named chairman of the executive committee; and all vice presidents of the subsidiary company were elected to similar positions in the consolidated company. George Legh-Jones will continue as chairman of the board of directors, and P. E. Lakin, vice president, was also named a director and will continue as the firm's senior representative on the Pacific Coast.

557,000-Bbl. Allowable Is Set for Louisiana

BATON ROUGE.—Restoring cuts made in June and July, the Louisiana Conservation Commission last week set a crude allowable of 557,000 bbl. daily for October, an increase of 48,000 bbl. daily from September.

The per-well allowables range from 76 bbl. for wells less than 2,000 ft. deep to 460 bbl. for wells below 14,000 ft. A net production of about 533,000 bbl. daily is expected.

Production of Asphalt-Base Crudes Is Raised in Texas

Production of heavy asphaltic-base crudes, which was cut by 3,000 bbl. in 10 Texas fields in September because of slackening of demands, has been increased by Texas Railroad Commission due to recently improved markets demand.

The increase, effective October 1, will average about 2,650 bbl. daily more than the 40,705 bbl. daily originally allowed the fields by the commission's October proration order.

Fields involved are Como, Mitchell Creek, Sulphur Bluff, Alba, Coke, Coke (sub-Clarksville), Manziel (sub-Clarksville), Merigale Paul (sub-Clarksville), Norman Paul, Talco, and Yantis, all in East Texas.

Cooperation Stressed at R.M.O.G.A. Casper Meeting

The need for cooperation between the oil industry and federal and state agencies was emphasized at the recent meeting of the Rocky Mountain Oil and Gas Association Public Lands Committee in Casper. The meeting was headed by R. D. Townsend, chairman.

Frank Castleberry, president of Wyoming Landmen's Association; H. Byron Mock and A. D. Molohon, regional administrators, Bureau of Land Management; Pierre LaFleiche, Wyoming state mineral supervisor; J. R. Schwabrow, supervisor, Northwestern U. S. Geological Survey Conservation Branch; L. E. Hoffman, chief, Minerals Branch, Bureau of Land Management, and Walter G. Davis, Casper independent, addressed the group on aspects of federal and state land-leasing operations.

Watching Washington

(Continued from page 39)

of the major producing countries and companies."

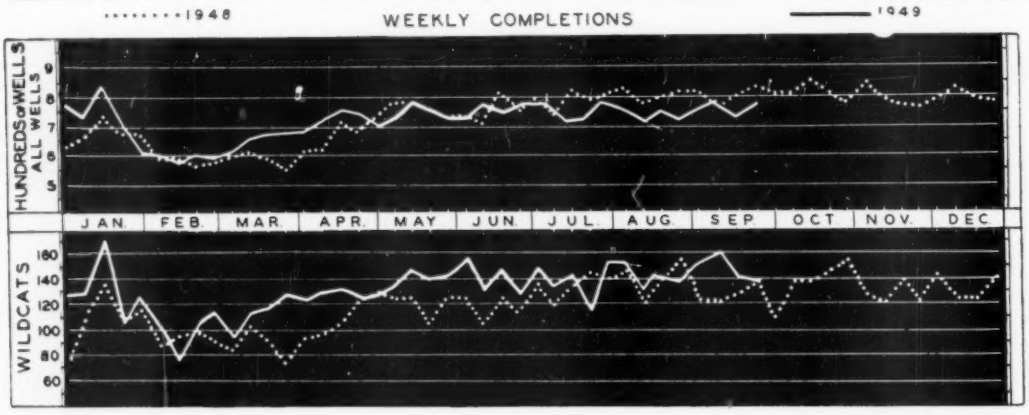
Although none of the officals involved will discuss the matter, it is believed in some quarters that devaluation of currencies has injected the question of prices into the three-country considerations. European companies, French and Dutch as well as British, are in a much better position to do business in soft-money areas than are the American companies, a factor which must be recognized in any solution of the problem that is reached.

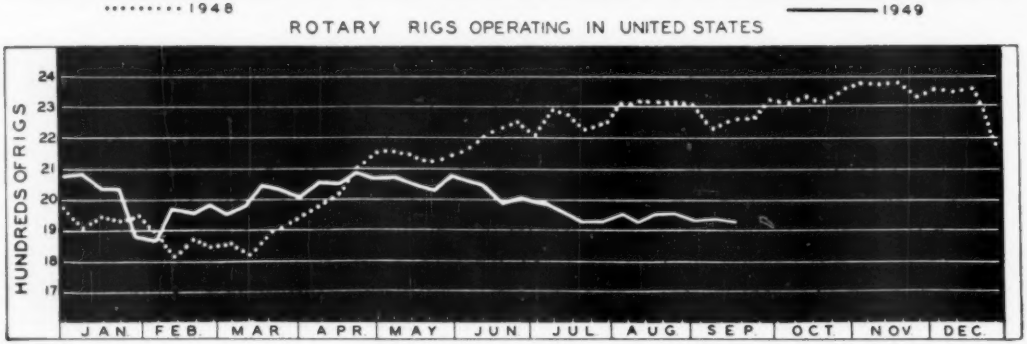
The basic problem before the meetings is that of reducing the dollar drain on England with a minimum effect on the operations of the American companies. Boiled down, the question is whether, if, for instance, the British took over the whole sterling oil market, that drain would be reduced sufficiently to justify what would happen to our own companies. All talk about greater convertibility so the American companies can convert more of their sterling earnings into dollars and other pnases of the problem, in the last analysis, gets down to just that.

WEEKLY WELL COMPLETIONS . . . WEEK ENDED SEPTEMBER 24, 1949

	Total of all wells					38 wk		Wildcat completions and discoveries					Cumulative total, 1949				
	Comp.	Oil	Gas	Dry	Footage	1949	1948	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	17	8	0	*9	20,828	708	1,091	0	0	0	0	0	0	0	0	0	0
Pennsylvania	36	15	5	†16	78,432	1,059	1,852	0	0	0	0	0	0	0	4	1	5
West Virginia	9	1	6	2	26,854	359	587	0	0	0	0	0	1	0	11	8	20
Ohio	7	2	3	2	13,947	759	977	0	0	0	0	0	1	0	2	25	28
Indiana	30	14	0	16	53,387	950	771	1	0	0	6	7	26	0	2	174	202
Kentucky	22	6	6	10	42,237	679	529	2	0	0	3	5	23	0	0	57	80
Illinois	59	26	0	33	126,961	1,865	1,700	2	0	0	9	11	50	0	1	317	368
Michigan	23	11	0	†12	40,937	727	596	0	0	0	5	5	21	0	3	220	244
Kansas	63	30	10	23	208,550	2,311	2,221	2	0	1	15	18	55	0	7	301	363
Neb., Mo., Iowa	0	0	0	0	0	16	6	0	0	0	0	0	1	0	0	11	12
Oklahoma	81	41	1	§39	303,579	3,104	2,962	0	0	0	13	13	101	11	12	459	583
Texas	296	195	21	80	1,274,522	9,644	8,513	6	1	5	44	56	302	39	91	1,673	2,105
North Central (Dist. 7-B & 9)	97	48	4	*45	283,944	3,241	2,684	4	0	3	22	29	143	0	15	665	823
West (Dist. 7-C & 8)	74	68	0	6	398,986	2,314	2,312	0	0	0	6	6	39	0	3	190	232
Panhandle (Dist. 10)	32	17	14	1	98,437	716	433	0	0	0	0	0	1	0	0	8	9
Eastern (Dist. 5 & 6)	19	16	1	2	80,414	505	389	0	0	0	1	1	8	4	3	110	125
Gulf Coast (Dist. 2 & 3)	47	30	1	16	274,487	1,458	1,349	1	1	1	10	13	60	28	39	289	416
Southwest (Dist. 1 & 4)	27	16	1	10	138,254	1,410	1,346	1	0	1	5	7	51	7	31	411	500
Louisiana	56	40	6	10	291,485	1,662	1,643	1	0	0	3	4	44	14	4	149	211
Northern	38	31	5	2	145,794	983	1,099	0	0	0	1	1	3	2	0	66	71
Southern	18	9	1	8	145,691	679	544	1	0	0	2	3	41	12	4	83	140
Arkansas	4	0	0	4	19,424	232	210	0	0	0	2	2	3	0	0	53	56
Mississippi	7	5	0	2	50,537	250	291	0	0	0	2	2	4	1	1	76	82
Southeastern States	0	0	0	0	0	36	41	0	0	0	0	0	1	0	0	30	31
Montana	2	1	0	1	7,852	192	206	0	0	0	0	0	3	0	2	24	29
Wyoming	8	6	0	2	36,616	436	388	2	0	0	1	3	21	0	0	85	106
Colorado-Utah	2	2	0	0	11,067	112	170	0	0	0	0	0	2	0	0	46	48
New Mexico	14	10	1	3	65,546	368	433	1	1	0	0	2	11	1	2	36	50
California	53	36	3	14	251,239	1,906	2,084	2	0	0	8	10	30	0	6	334	370
Total United States	789	449	62	278	2,924,000	27,375	27,271	19	2	6	111	138	700	66	148	4,079	4,993
Total previous week	732	384	71	277	2,488,126	26,586	26,430	19	1	5	115	140	681	64	142	3,968	4,855
Total September 25, 1948	841	460	73	308	2,816,715			18	1	7	113	139	645	54	192	3,602	4,493

Service wells included: *9, †12, ‡2, §3, ¶1





DAILY AVERAGE PRODUCTION FOR WEEK

	Sept. 24 crude oil	B. of M. Sept. demand	Sept. 17 crude oil
Alabama	1,300	1,350	1,450
Arkansas	70,500	88,000	70,600
California	894,000	920,000	893,600
Colorado	65,600	70,000	63,800
Eastern	61,400	60,800	57,200
Florida	975	1,400	1,125
Illinois	176,100	180,000	177,700
Indiana	27,300	28,000	27,400
Kansas	275,250	302,000	250,000
Kentucky	23,500	22,000	23,100
Louisiana	486,400	528,000	485,550
North Louisiana	114,400		113,950
South Louisiana	372,000		372,000
Michigan	46,400	46,000	42,200
Mississippi	101,100	110,000	95,550
Montana	27,300	25,000	27,300
Nebraska	550	700	600
New Mexico	124,200	134,000	124,200
Oklahoma	391,000	410,000	387,350
Texas	1,979,100	2,130,000	1,979,100
Dist. 1 (Southwest)	27,200		27,200
Dist. 2 (Southwest)	122,700		122,700
Dist. 4 (Southwest)	189,300		189,300
Dist. 3 (Gulf Coast)	373,000		373,000
Dist. 5 (Eastern)	34,500		34,500
Dist. 6 (Eastern)	83,250		83,250
East Texas field	244,400		244,400
Dist. 7-C (West)	50,300		50,300
Dist. 8 (West)	560,300		560,300
Dist. 7-B (W. Central)	61,325		61,325
Dist. 9 (N. Central)	140,300		140,300
Dist. 10 (Panhandle)	92,525		92,525
Utah	2,050	900	2,100
Wyoming	127,100	122,000	126,500
Total United States	*4,881,125	5,180,000	4,836,825
Change from previous week, up	44,300		
Canada	70,920		68,785

Total production January 1-September 24 †1,352,476,850 bbl.
Same period last year (crude plus cond.) 1,468,718,245 bbl.

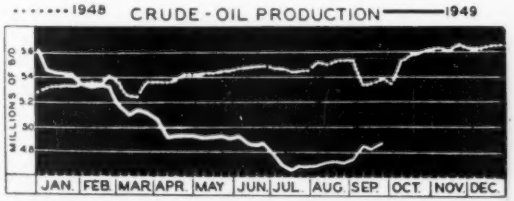
*Not including 81,335 bbl. condensate †Including 22,119,500 bbl. condensate.

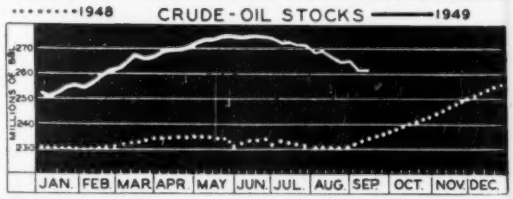
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

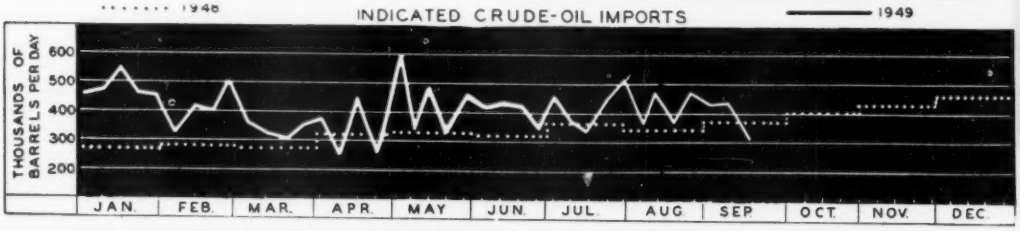
(Thousands of barrels)

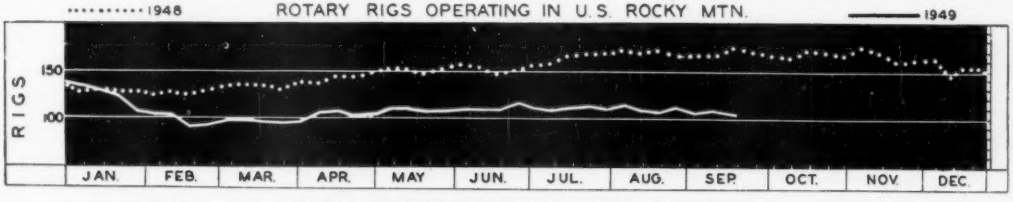
	Sept. 17, 1949	Sept. 10, 1949	Sept. 18, 1948
Pennsylvania Grade	3,261	3,303	2,784
Other Appalachian	1,936	2,354	1,327
Illinois, Indiana, Michigan	12,612	13,186	10,876
Arkansas	2,646	2,720	3,107
Louisiana	14,433	14,532	11,989
North	3,511	3,573	2,876
Gulf	10,922	10,959	9,113
Mississippi	2,761	2,629	2,793
New Mexico	7,477	7,535	6,121
Oklahoma and Kansas	38,625	38,892	34,735
Texas	119,965	118,235	112,819
East Texas	17,673	16,473	16,780
West Texas	47,455	47,363	42,543
Texas Gulf	28,461	27,804	29,188
Other Texas	26,376	26,595	24,308
Rocky Mountain	13,886	13,915	9,310
California	35,939	36,070	†
Foreign	6,818	7,765	4,502
Total United States	260,409	261,136	†

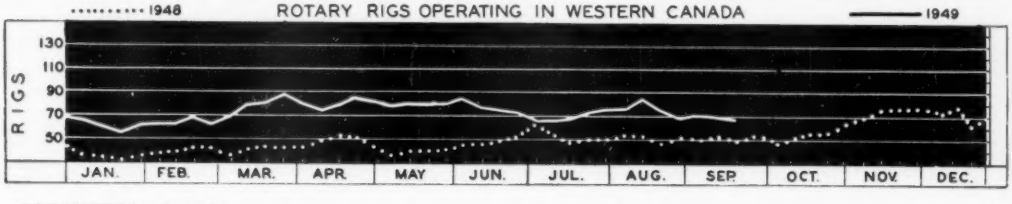
*Bureau of Mines. †No California report September 18, 1948











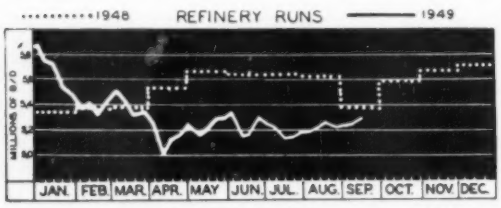
Refining Statistics

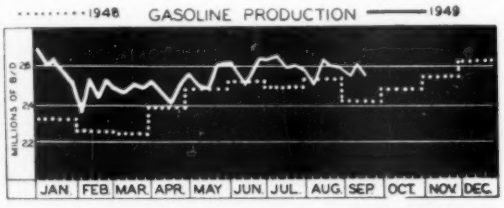
A.P.I. REFINERY REPORT, SEPTEMBER 17

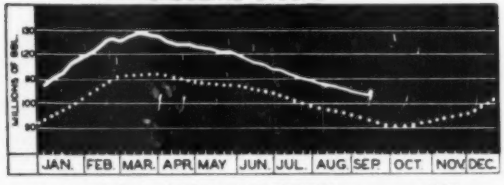
(Thousands of barrels)

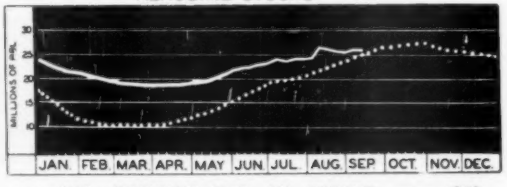
District	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, September 1948				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	790	322.7	17.7	190.4	170.9	23,024	10,862	24,422	9,866	878	306.9	36.8	180.8	231.7
Appalachian:														
District 1	89	43.7	4.3	10.9	9.3	2,321	403	818	403	99	42.7	5.4	12.8	13.1
District 2	65	34.0	4.0	8.0	14.1	1,078	141	240	85	27	13.0	1.4	4.6	9.2
Ind., Ill., Ky.	914	482.9	57.0	117.3	140.3	22,187	5,406	12,897	4,101	959	488.7	55.6	132.4	152.5
Okla., Kans., Mo.	414	232.4	15.3	78.6	57.7	8,974	1,751	6,435	1,959	474	248.5	22.6	86.9	76.3
Inland Texas	217	135.6	8.7	25.8	43.0	3,652	702	947	1,438	251	157.9	12.5	24.1	62.9
Texas Gulf Coast	1,287	574.6	86.1	232.1	225.9	14,782	3,517	12,788	7,437	1,427	625.9	102.5	308.9	250.6
La. Gulf Coast	425	222.0	34.7	98.7	65.7	5,677	2,133	4,241	2,173	438	191.7	53.3	82.7	72.5
N. La. and Ark.	82	43.1	5.0	12.6	15.4	2,694	427	899	323	86	33.4	8.0	13.0	18.4
Rocky Mountain:														
New Mexico	8	4.6		1.0	2.1	55	25	96	29	13	6.8	0.5	1.8	3.9
Other Rocky Mtn.	184	86.6	3.9	40.6	32.9	2,367	375	2,063	599	160	70.4	4.3	25.8	31.7
California	831	377.1	14.6	136.4	292.0	16,520	694	14,268	40,114	581	230.2	6.7	103.0	239.8
Sept. 17, 1949	5,306	2,549.3	251.3	952.4	1,069.3	103,331	26,436	80,114	68,527	5,393	2,416.1	309.6	976.8	1,162.6
Sept. 10, 1949	5,248	2,610.0	284.6	922.1	1,115.4	104,375	26,608	78,231	69,161					
Sept. 18, 1948	5,187	2,303.1	299.4	1,005.1	1,090.7	91,800	25,290	69,090	57,313					

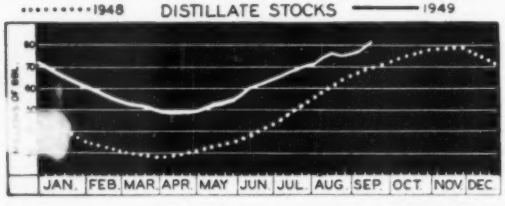
*At refineries including natural blended. †Finished and unfinished. ‡Revised in California.

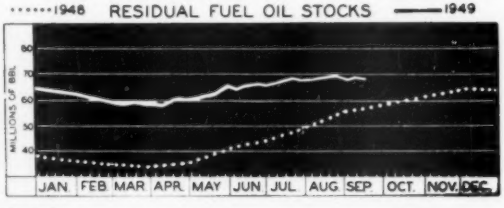


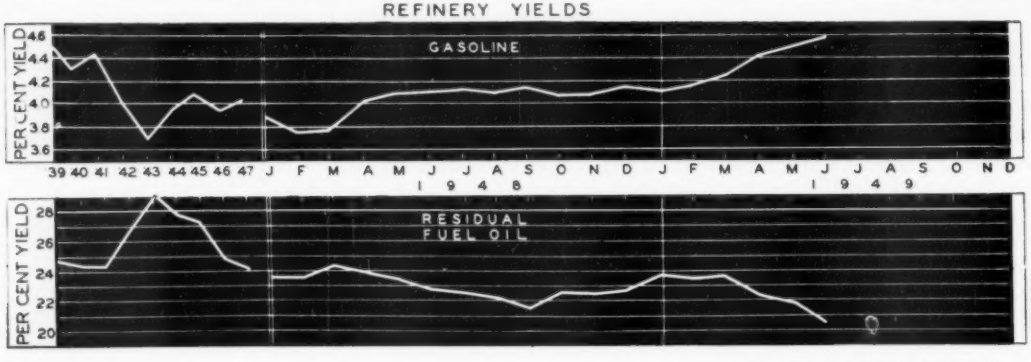











REFINERY YIELDS
GASOLINE
PER CENT YIELD
39 40 41 42 43 44 45 46 47 J F M A M J J A S O N D J F M A M J J A S O N D
1948
1949
RESIDUAL FUEL OIL
PER CENT YIELD

CRUDE PRICES
GRAVITY SCHEDULE

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.53			
19-19.9	1.63			
20-20.9	1.73	$2.25		$2.12
21-21.9	1.82	2.27		2.14
22-22.9	1.92	2.29		2.16
23-23.9	2.02	2.31		2.18
24-24.9	2.12	2.33	$2.56	2.20
25-25.9	2.22	2.35	2.58	2.22
26-26.9	2.31	2.37	2.60	2.24
27-27.9	2.37	2.39	2.62	2.26
28-28.9	2.42	2.41	2.64	2.28
29-29.9	2.48	2.43	2.66	2.30
30-30.9	2.54	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.64	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. Above changes do not include recent reductions of a few buyers applying principally to low-gravity grades.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

East Texas†	$2.65
Kettleman Hills, California*	2.77
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	3.40
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

THE general firming of distillate fuel prices, first evidenced in the disappearance of "below the market" material in the Mid-Continent area and later in price gains in the Gulf and East Coast markets, has resulted in increases in quoted prices for the Mid-Continent areas. Increased distillate movements started about the middle of August without any pronounced gain in the general price level. Price increases in September without further major gains in indicated demand are indicators of the shifts which have taken place in the distillate market in the past month. With the heating season just around the corner, most suppliers decided against dumping a large volume of fuel on the market at prices below the cost of crude.

Distillate stocks east of California are only about 6,200,000 bbl. greater than at this time last year and this difference may be offset by unfilled consumer and reseller storage. The gradual filling of this storage accounts for the increase in total refinery demand from about 550,000 bbl. daily early in July to 745,000 bbl. daily for the 5 weeks ended September 17.

The fact that most suppliers refuse to quote a fixed price for October deliveries indicates that they expect further gains in distillate prices before the heavy demand season starts.

Increased demand for natural gasoline has resulted in a gain of .25 cent in the quoted price for grade 26-70, bringing Group 3 up to 5.75 cents and North Texas to 5.25 cents. Sales are reported to be good with suppliers using more natural in the blends for cooler-weather driving.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of September 26, 1949. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Tex. Gulf Coast
Regular gasoline, 74-76 octane	9⅝-10	11.5	9½-10
Premium gasoline, 78-80 octane	10⅜-11	12.5	10½-11
42-44 w.w. kerosine	7¾-8¼	8.4-8.9	7⅝-8⅛
No. 2 straw fuel oil	6⅝-6¾	8.0-8.5	7-7⅛
No. 6 residual	$0.85-1.00	$1.70-1.90	$1.40-1.50

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5¾	5¼	5½
Grade 18-55	6.9	6.3	6.6

LUBRICATING OILS
SOUTH TEXAS

200 vis., No. 2-3 neutral	10.5
750 vis., No. 3-4 neutral	13
2,000 No. 5-6 neutral	14-15

LUBRICATING OILS
Mid-Continent

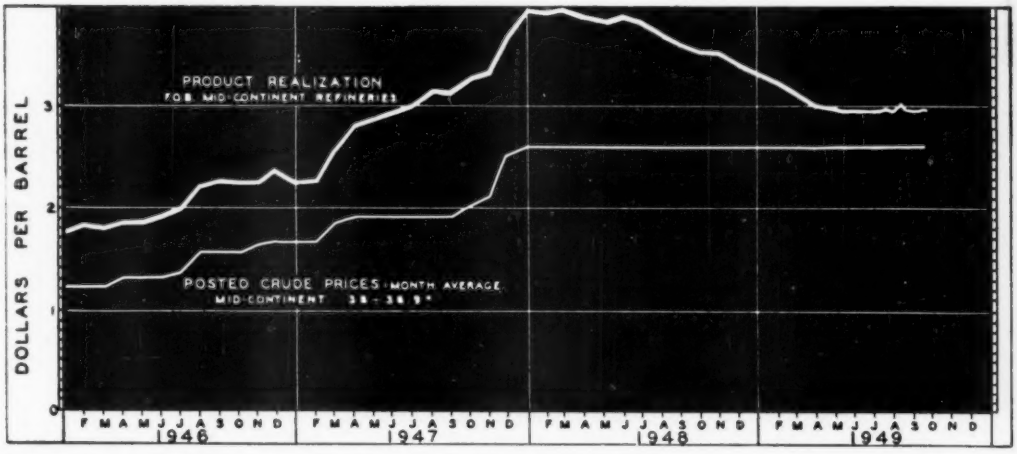
150-160 vis., D bright stock, 0-10 pp.	19
200 vis., No. 3 neutral, 0-10 pp.	12-14

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	19.5
180 vis., 0 p.t. neutral	20.5

WAX
Mid-Continent

132-134 A.M.P.	4.25



In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil.

EQUIPMENT MEN . . . in the News

Goodenough Opens Gas Measurement Service

H. GOODENOUGH

Herbert F. Goodenough announces the opening of an engineering service for gas measurement at Fort Worth. Goodenough was formerly associated with Refinery Supply Co., of Tulsa, having been with that firm for over 20 years.

His engineering service will provide the functions of a gas-measurement department to gas and oil producers who do not have these facilities in their organizations. The service will consist of all the necessary and recognized procedures as: oil and gas ratio, gas, orifice meter, specific gravity, gravitometer, water content, sulfur content, and line leakage tests as well as testing of meters and chart calculations.

Youngstown Boosts Hachat

Darwin E. Hachat, formerly general foreman of the power division, has been promoted to superintendent of power at the Indiana Harbor plant of Youngstown Sheet & Tube Co. He has been with the company 20 years.

Hargis Joins I. X.

A. V. Hargis, formerly with Stanolind Oil & Gas Co., has joined Independent Exploration Co. of Houston as party chief for I. X.'s party 17, making geophysical surveys near Edmonton, Alta., Canada. He is from Goliad, Tex.

Hughes Tool Forms Canadian Subsidiary

Hughes Tool Co. has formed a Canadian corporation, Hughes Tool Service, Ltd., with headquarters in Calgary. A group of Hughes sales executives made an extended trip to Canada to set up operations, increasing personnel with Canadian citizens.

The company is constructing its own main warehouse in Edmonton and will lease rock bits through its authorized distributors patterned after their United States operations.

H. E. Snelson, a Canadian, formerly Rocky Mountain division engineer, has been made Canadian district manager. R. T. Helmer continues his duties as Canadian district sales representative.

Officers of the Hughes Tool Service, Ltd., are: M. E. Montrose, president, Houston; W. L. Hunter, vice president, Oklahoma City; F. E. Jacobs, treasurer, Houston; and R. T. Helmer, secretary, Calgary.

Hughes officials who helped set up operations in Canada are: M. E. Montrose, vice president, sales; W. L. Hunter, northern region manager; S. J. Lintzenich, Rocky Mountain division manager; H. E. Snelson, Canadian district manager; R. T. Helmer, Canadian sales representative; and E. R. Woodmansee, manager tool joint sales

Cutler-Hammer Opens Louisville Office

Opening of a new sale office at Louisville has been announced by Cutler-Hammer, Inc., Milwaukee. A branch of the company's Cincinnati district office, under the direction of E. C. Bolton, the Louisville office is managed by W. J. Phillips, formerly of Cincinnati district. Louisville territory includes most of Kentucky and a part of Indiana.

Greene Organization Announces Expansion

G. Z. GREENE

Gordon Z. Greene, longtime West Coast oil and gas specialist, has announced an expansion of his organization. The firm, Gordon Z. Greene Co., is now exclusive distributor in California for Commercial Iron Works of Los Angeles, manufacturer of leveling saddles and orifice fittings.

It is also exclusive agent on the Pacific Coast for Vulcan Proofing Co., of Brooklyn, which specializes in rubber-coated materials for meter and regulator diaphragms. In addition, the Greene organization is California agent for Chaplin-Fulton Manufacturing Co., of Pittsburgh, makers of high and low-pressure regulators and relief valves; and represents Research Control Instrument Co., of Tulsa, manufacturers of miniature control valves and panel-board clocks.

Greene also has made to its own specifications such items as meter houses, thermometer wells, pressure gages, drip pots, large-capacity gas filters, and calibrated and bored meter runs.

Shelton Joins S & S Radio

H. C. Shelton, formerly secretary-treasurer of Coralena Oil Co. and later general manager of the A. H. Kasishke interests, has become associated with Lloyd H. Smith in S & S Radio Supply, Tulsa.

Smith formerly was with Western Geophysical Co. and before that with Geophysical Services, Inc., and Na-

tional Geophysical Co. S & S Radio Supply will stock equipment for geophysical exploration.

Three Join Babcock & Wilcox

Hayden Jones, Jr., M.S. chemical engineering from Iowa State College, Norman Phillips, B.S. in fuel technology from Pennsylvania State College, and Earle Young, Jr., B.S. in chemical engineering from Carnegie Institute of Technology, have recently been added to the chemical laboratory staff of the research and development department of Babcock & Wilcox Co., in Alliance, Ohio.

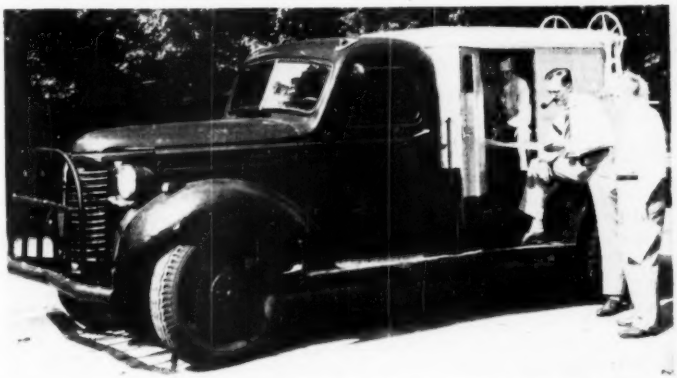
Toth, Kreissig, and Sedlak Join Harnischfeger Corp.

Harnischfeger Corp. has announced the addition of three men to its sales staff. George J. Toth has been assigned to cover the South and Eastern territory with headquarters at Charlotte, N. C. Alfred F. Kreissig has been appointed to cover the Southwest oil-field territory with headquarters at Dallas, and Frank E. Sedlak will cover the Midwestern territory with headquarters at Indianapolis, Ind.

Toth has had several years' experience in sales and servicing of diesel, gasoline, and aircraft engines. For the past 2 years he has been associated with R. H. Sheppard Diesel Co. Kreissig has had several years' of sales engineering experience as sales manager for Midwestern Engine & Equipment Co., Tulsa, and previously with Continental Motors Corp. as district representative.

Sedlak has recently gone through P. & H. Diesel service school at Port Washington, Wis. He was also associated with R. H. Sheppard Diesel as district sales engineer.

SSC Presents Seismic Unit to Colorado School of Mines



This 12-trace reflection seismic recording unit is being presented to Colorado School of Mines, Golden, by Seismograph Service Corp., of Tulsa. Making the presentation for S.S.C. is Dr. J. E. Hawkins, vice president (right), and receiving the truck on behalf of Colorado School of Mines is H. E. Stommel, instructor of geophysics. Grady Steil, instrument supervisor with S.S.C., is on the operator's seat in the unit

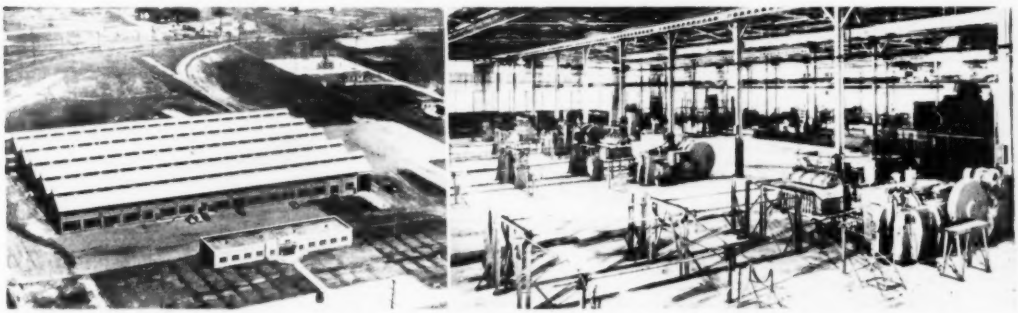
Emsco Opens New Ultramodern D+B Plant At Garland

A new plant, operated by the D+B division of Emsco Derrick & Equipment Co., is now in full production of a complete line of oil-well plunger pumps, sucker rods, couplings, and other production accessories for oil fields.

Covering nearly 15 acres, the new plant is located on Belt Line Road in Garland, Tex., 15 miles northeast of Dallas. The entire new plant was designed and tooled for the production of sucker rods, sucker-rod couplings, and deep-well plunger pumps and accessories. Many pieces of machinery are the only ones of their kind in the world, having been designed specifically for this plant. Typical of these machines are the full-length normalizing and drawing furnace for precise heat treatment of sucker rods, the Barnes honing machine for precision honing of interior surfaces of pump tubes and working barrels, and the Tocco high-frequency induction machine for case-hardening sucker-rod couplings.

Three separate buildings make up the new D+B plant: the office building; the combination guardhouse, change room, and clock house building; and the main shop building. The main office building covers a total of approximately 5,400 sq. ft. The shop building is of steel-frame construction, and is composed of five 50-ft. bays, each 360 ft. long. Each bay is served by a 5-ton monorail-type crane. Five railroad cars can be spotted within the building. A testing laboratory and shop offices are located in the main shop building.

The D+B division of Emsco was originally founded in 1905 by Daniel Daniels, and the first shop building, 28 ft. wide and 46 ft. long, was constructed in Los Angeles in the same year. A new plant was constructed in 1919 and in 1924 a Dallas plant was constructed to meet Mid-Continent needs. In 1927, Emsco purchased the two plants of D+B Pump & Supply Co.



At left is an aerial view of the New D+B plant at Garland, Tex., recently opened by Emsco Derrick & Equipment Co. Right is a general over-all view of the sucker-rod section of the main shop building with forging furnace in foreground. The forging furnace heats ends of sucker rods, after which upset is forged in multiple forging operations

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 12 cents a word. Minimum charge, $3.00 per insertion. Centered Line, any ad, $1.00.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$12.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR SALE: Failing Model 1500 Heavy Duty Rotary drilling rig, equipped with 4½" x 6" mud pump, mounted on 1948 International KB6 truck, complete with drill pipe, subs, tools, etc. Also 800 gallon custom built water tank, equipped with vacuum lift, mounted on 1948 International KB6 truck. All equipment in excellent condition. Address: Box D-168, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: Cardwell Rotary Rig, complete with Mast. Suitable for 3,500 ft. drilling. Bargain. Terms. Melton Supply Co. Seminole, Okla.

CORE Drilling & Shot Hole Rigs; Longyear, Sullivan, Franks, Chicago Pneumatic Good used equipment, ready for service PK rods, N rods, B rods, bits, Spudders and cable tools. Everything for well drilling We save you money. Pressey & Son, Pueblo, Colo.

STEEL STORAGE TANKS

Railroad Tank Car Tanks 6,500 to 12,000-Gal. Cap. Coiled and Non-Coiled

Cleaned—Painted—Tested
Heavier—Safer—Cheaper
Other Tanks, Too.

Also — Complete Tank Cars 8,000 and 10,000-Gal. Cap.

Your Inquiries Solicited

NEWHALL-MARSHALL-WOOD, INC.

30 Church Street New York 7, N. Y.
Phone: COrtlandt 7-8090

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

CARDWELL RL SPUDDER. Completely equipped. Good operating condition. Located Central Oklahoma. For prices and terms write: Barnes Drilling Company, 22 West Fourth St., Tulsa, Oklahoma.

FOR SALE: Failing "1500" portable rig for shot-hole, core, water-well, and shallow production drilling. Equipped with sand reel and bailer. Mounted on GMC truck. Rig and Truck in excellent condition. Rider & Montgomery, Box 523, Douglas, Wyoming.

FOR SALE

In excellent mechanical condition located in West Texas:

1. IDECO Model PR-150 Drawworks complete with air flex clutches and 145-GKU Waukesha Gas-Gasoline-Butane engine with Brown Lipe transmission.
1. 5 x 10 Gardner-Denver power pump unitized on steel skids with Model L-525 Buda Gas-Gasoline-Butane engine.
1. 87' Lee C. Moore Jack Knife Derrick complete with sub base and with 5' substructure, walks and stairs.
1. Brewster Model OB 12" Rotary Table with master bushings.
1. BJ Model 75 hook.
1. 1½ KW Kohler Light Plant.

Equipment must be seen to be appreciated.

Write, wire or phone

EMPIRE MACHINERY COMPANY, LTD.
Box 4026, Phone LD 18 or 9161, Odessa, Texas

NEW
FRACTIONATING TOWER
REFLUX DRUM

One (1) New fractionating tower, 5'-0" I.D. X 89'-6" over-all height X 1⅛" plate. Thirty-four (34) bubble trays, ten (10) 18"-300# manways. Stress relieved and built in accordance with API-ASME Code for 350 PSI working pressure.

One (1) new horizontal reflux drum, 5'-6" I.D. x 18'-6" over-all length x 1⅞" plate. Stress relieved and built in accordance with API-ASME Code for 350 PSI working pressure.

ROCK ISLAND OIL & REFINING CO., INC.
335 West Lewis St. Wichita, Kansas
Phone 7-3325

EQUIPMENT FOR SALE

FOR SALE: Radial drill press used six months. One Jackson engineering reboiler, size 16-35-75, tube pressure 175 lbs., temperature 380° F. Model #1, heater #265. Excellent condition. Box 610, Mt. Pleasant, Texas

2—170 HP Type 80 Twin Cooper, 2—80 HP Type 8 Bessemer, Direct Driven Compressors. 2—50 HP Type EC Bessemer Gas Engines. 2—18x12 Worthington Twin Vacuum Pumps. Also cylinders and spare parts for Cooper, Bessemer, Clark Compressors Nolan Sales Corp., Tulsa, Okla.

NATIONAL "50" Compound Double Drum Rig 120' Cantilever Ideco Mast, 10' substructure, 6,000' 4½" drill pipe, this rig complete and in excellent condition. P.O. Box 205 Sta. B. Bakersfield, California.

TANK CARS

22—10,000 Gallon, Class 3, Tank Cars, interchangeable type, all first class operating condition. Detailed specifications available upon request. Priced attractively for prompt delivery.

Box D-213, The Oil and Gas Journal, Tulsa, Oklahoma

PACKAGED H_2S REMOVAL UNITS

We offer prompt shipment on skid-mounted hydrogen sulfide removal units for treating sour gas for pipe line or fuel gas purposes.

GRAFF ENGINEERING & EQ'PT. CO.
3415 Westminster, Dallas 5, Texas

FOR SALE

12—230 H.P. Type 10 Bessemer New 17" Power Cylinders complete ready to run with 16" to 18" Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

PIPE THREADER

1 #8 HD Jarecki, High Speed, Pipe Threader, capacity 1½" to 8", complete with chasers and six sets new dies, Timken fitted, 6 spindle speeds, automatic, self-opening die head—cut off and reamer attached, complete with 5 HP motor, mounted in base. BARGAIN PRICED.

STEWART BOLLING & CO., INC.
3190 E. 65th St.
CLEVELAND 4, OHIO

DIESEL POWERED PUMPING EQUIPMENT

A number of 2 cycle and 4 cycle Diesel Engines 200 to 750 HP. All under 300 R.P.M. Geared to plunger pumps handling 420 to 1470 GPM at 750 lb. On foundations in Ill., Mo., Kans., and Okla. Will sell units complete or Engines and Pumps separately.

Priced to allow purchase of Engines or Pumps for Spare Parts.

Inquire—Purchasing Agent

STANOLIND PIPE LINE CO.
Box 1979, Tulsa, Oklahoma

FOR SALE

120,000'—6⅝" OD, 17.65#, seamless, range 3, beveled.
80,000'—4½" OD, 8.65#, seamless, range 3, beveled.

Ready for immediate delivery, A-1 every respect, priced to sell. Location, Tulsa, Oklahoma

W. C. BERRY
Box 1858 Tulsa, Oklahoma Phone: 3-6141

MODEL 6-LRO WAUKESHA ENGINE

Operated total of 250 hours

8½" bore x 8½" stroke, 2894 cu. in. displ. Complete with radiator, clutch power take-off, starting engine, LPG heat exchanger and all standard accessories. Substantial discount.

LUCEY PRODUCTS CORPORATION
624 S. Cheyenne TULSA, OKLAHOMA Phone: LD 204

EQUIPMENT FOR SALE

FOR SALE, at Oklahoma City: 17,500' of 2⅞" OD 6.4 upset seamless steel tubing line pipe and 12,500' of 3", 7.7 TMC and PE line pipe, all used. Cheap. Cities Service Oil, Patridge, Bartlesville, Okla.

FOR SALE: Foxboro, Westcott and Emco Orifice Meters with Piping, Mercury and Leveling Saddles. Also Davis and Chaplin-Fulton Regulators. George R. Milner, Okmulgee, Oklahoma.

FOR SALE: Two Fairbanks-Morse Diesel Engines, 150 H.P. Twin Cylinder, Horizontal Type. Completely overhauled. $1500.00 each. Melton Supply Co., Seminole, Okla.

FOR SALE: Truck-mounted 30 HP Bettis Steamer, complete with water tank, fuel tank, tools. Suitable for steam cleaning, oil treating. Dave Edmiston, Russell, Kansas.

FOR SALE: McKissick Tubing and Floor Blocks. Save 50%. Melton Supply Co., Seminole, Okla.

ROLAGRIP COUPLINGS.—For Sale, 100 tons, 1½" to 8" line, Blk. & Galv. Complete with bolts and neoprene gaskets. Never in use. Send for list and price. Julius M. Fogelman, 1649 Perkiomen Ave., Reading, Penna.

Several Army Surplus 4½" x 6" Gaso Duplex 1860 Pumps—two piece skid mounted with Chrysler 8 cylinder engines. Will sell pumps only or complete units about half price.

H. H. COFFIELD
ATTN: W. H. Orr
Phones: 132—Rockdale, Texas
A-65064—Houston, Texas

NEW 6⅝" O.D. API LINE PIPE

73 miles new 6⅝" O.D. 13# API Electric Weld Line Pipe.

ROCK ISLAND OIL & REFINING CO., INC.
501 KFH Building, Wichita, Kansas

FOR SALE

at Oklahoma City, Attention Lee Croom:

1—8" Landis Type 8 Ser. # 144-4 Pipe Machine with 2 Landis Heads	$2,750.00
1—3' Canedy Otto Radial Drill, bought '44	2,000.00
1—Barnes 20" Upright Drill	500.00
1—Aristo Pedestal Type 3 HP Power Grinder	165.00
5—300 Amp. Elec. Lincoln Welding Mch. Skid Model, Ea.	200.00
1—400 Ditto	200.00
1—#8 Wells Steel Horiz. Band Saw	200.00
3—2" Toledo Higir Speed Pipe Machine, ½" to 2" w/ Quick Opening Head, each	850.00
1—Toledo AC Power Drive with Univ. Drive Shaft	200.00

CITIES SERVICE OIL COMPANY
Patridge, Bartlesville, Okla.

COMBINED VAPOR SEPARATOR & FRACTIONATOR FOR THERMAL REFORMING

One (1) New 5'-6" ID x 61'-0" over-all height Bubble Tower made of 1¼" Plate and lined throughout with 5/64" and 7/64" thick, 11-13% Chrome stainless steel, type 405. Stainless steel support plates in place for 15 Trays, (Trays not included). Constructed in accordance with the API-ASME Code, stress relieved and radiographed. Designed for 400 PSI @ 750° F. Fabricated by A. O Smith Corporation. Platform and ladder clips installed.

WOOD RIVER OIL & REFINING CO., INC.
335 West Lewis Street, Wichita, Kansas
Telephone 7-3325

EQUIPMENT FOR SALE

404 CORE BARREL—Drills faster, takes larger core, runs in 6¼ inch casing. Makes 2⅞ inch core. Prices quoted on request. Mf'g by East Side Machine Works, 17 S. Ashby, Chanute, Kansas.

ONE Ironcraft and five Kelpsch type floating marsh buggies. For inspection and price bid contact James, Linden 5108, or mail inquiries to 1012 Claxton Street, Houston 17, Texas.

FOR SALE at Bartlesville—1 ELI Shot Hole Drill Truck with 4" x 5" Gardner Denver Pump mounted on 1945 1½ ton Ford Truck, $2,000.00. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE: 1—Pipe pulling outfit complete with Caterpillar tractor, and Cardwell single drum winch, with spudder attachment, 48' wood-A-Mast and all tools. Price $3500.00; 1—Extra Pipe pulling pole mounted on dual wheel rubber-48'-long-5-sheave Western Iron crown. Price $1000.00; 1—Converted Star spudder, #26 Caterpillar 30—Tractor powered—Tools, but no lines. Price $1750.00; L. B. Finney, Box 455, Madison, Kansas.

FOR SALE: New Beaird Packaged Compressor Plant with Ingersoll-Rand Type 6XVG 225 HP two stage gas compressor equipped with hand operated fixed volume pockets. Intake pressure range 100-200 PSI. Discharge pressure 1000 PSI. Capacity range 1,450 to 2,050 MCF. Ready to operate. Location Bishop, Texas, Box D-161, The Oil and Gas Journal, Tulsa, Oklahoma.

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FOR SALE: 15,000' of 6⅝" O.D. line pipe—40' lengths—excellent condition. H. L. Smith St. Elmo, Illinois. Phone 115.

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HELP WANTED

NEW foreign and domestic Oil Employment Directory. Over 500 listings in drilling, production, refining, natural gasoline, pipe lines, geological, exploration, supplies, manufacturers, services; and trucking, refinery and pipe line contractors, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2803, Tulsa, Okla (Our 28th year).

MUD ENGINEER or chemist to act as sales representative for new product, Kingseal, which is an oil well mud sealing fiber. Kingseal regains and prevents lost circulation. Laboratory and actual field tests prove Kingseal superior to any other product on the market. Prefer man with lengthy experience in Texas drilling and oil production. Kingseal is copyrighted and patent is applied for. Write owner, Homer L. Twining, Sta. A., Box 4151, San Antonio, Texas.

CORROSION MEN: Must have broad, thorough technical education, not less than five years of successful experience in application of cathodic protection to underground metallic structures, also broad knowledge of application of insulating coatings used to protect against electrolytic and anaerobic corrosion. Box D-199, The Oil and Gas Journal, Tulsa, Oklahoma.

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MECHANICAL ENGINEER. A Texas corporation needs an experienced oil tool design engineer. This man must have outstanding ability, a good employment record, and a capacity to create and develop new ideas. College background desirable. This is a good position with splendid opportunities for advancement. Please write to Box D-197 The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Land Man, capable of judging merits of acreage submittals for drilling and negotiating agreements for same. Please detail past experience. Answers held confidential and no inquiries made without permission. Liberal compensation. Box D-192 The Oil and Gas Journal, Tulsa, Oklahoma.

SALES representatives with established contacts to represent reputable manufacturer of pipe line wrapping material. New high speed equipment provides low costs. Write Pipe Line Division, Protective Papers, Inc., Union, Illinois.

HELP WANTED

WANTED—Experienced Seismologists and Seismic Computers by large, well established geophysical company. Give full details of education and experience in letter. All replies will be held confidential. Reply Box D-188, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Experienced Gravity Party Chiefs for crews in United States and Canada. Reply Box D-189, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER: Thorough university background followed by five or more years of outstanding achievement a definite requirement. Must have creative ability, a precision-technical mind. Men of less ability should not make inquiry. Salary commensurate with rigid requirements. A Missouri corporation. Correspondence confidential. Box D-200, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR large company operating throughout Mid-Continent and Rocky Mountain states. Contract man with land experience and knowledge of operations. Excellent opportunity. Please state education and experience. Inquiries confidential. Box D-167, The Oil and Gas Journal, Tulsa, Oklahoma.

SECONDARY RECOVERY ENGINEER Graduate Engineer. Three years field experience in waterflooding. Locate in Eastern Kansas. Salary open. Reply Box D-201, The Oil and Gas Journal, Tulsa, Oklahoma, giving age, education, experience, and salary desired.

SITUATIONS WANTED

PETROLEUM Engineer: 26 years old, wants a job with a future. Have always followed and taken greatest interest in drilling business. Have roughnecked and actually drilled for a total of three years. Box D-193, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY Superintendent: 35, desires change. Fifteen years experience crude distillation, thermal cracking and treating. Would consider shift foreman or stillman job with aggressive company. References available. Box D-205, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER—Can supervise operation and maintenance of your natural gasoline-LPG plant for highest efficiency through modern technical methods—age 29, married. Box D-198, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131, Ph. No. 131, Hobbs, New Mexico.

MICROPALEONTOLOGIST - GEOLOGIST, B.A., M.A., four years exploration and development experience in Ecuador, Peru, with major oil company, special interest paleo-stratigraphy; for foreign or domestic service. Excellent recommendations. Box D-196, The Oil and Gas Journal, Tulsa, Oklahoma.

SEISMOLOGIST
(Interpretation—Rework), with domestic and foreign experience. Desire position in U. S. Box D-195, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN-SCOUT, six years; accounting four years, all for independent operator, desires connection. Good background and training, married, steady and reliable, references. Write Box D-207, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION—DRILLING EXECUTIVE
Age 39, college trained, 20 years experience, 10 with Major. Capable of assuming complete management of drilling, completion, and production of oil and gas—utilization of casinghead gas, pressure maintenance, gas injection, water flooding, secondary recovery—desires connection with progressive, aggressive Independent. Box D-216, The Oil and Gas Journal, Tulsa, Oklahoma.

TOOL PUSHER: 45 years old, 12 years experience. Drilled for ten years, experience in ten states. Well acquainted with drilling problems. Available now. Box D-215, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

WELL known oil field supply company closing Tulsa office, local manager desires connection as Manufacturer's Representative in Tulsa. Familiar with drilling, production, refining sales. Have sold Texas, Gulf Coast, and Oklahoma. Will travel. Box D-214, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASEMAN: Experienced lease buyer desires temporary or permanent leasing and curative work. Location unimportant. Box D-212, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES Engineer thoroughly experienced in pumping and drilling machinery desires position with more future than present one. Available thirty days. Box D-219, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY Superintendent—Desires connection with Independent Refining Co. Years of experience, Domestic & Foreign. Reference furnished. Box D-218, The Oil and Gas Journal, Tulsa, Okla.

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LEASE AND DRILLING BLOCKS

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LEASE AND DRILLING BLOCKS

OWNER will give 6/8 oil and gas lease on 2500 acre block Pittsburg County, Oklahoma, for a deep test. Otis Garrett, 424 Perrine Bldg., Oklahoma City, Oklahoma.

1500 ACRE block, 12-4 Lincoln County. Close to Texas Company's big well. 800 acres, 12-5 surrounded by producing wells. Want well drilled. Encouraging Geology. Care: Box D-211, The Oil and Gas Journal, Tulsa, Oklahoma.

COCHISE Co. Ariz., Drilling Block; Sulphur Sprgs. Valley, 8000 acres for 4000 ft. test. Chas. Baldwin, Box 1107, Goodyear, Ariz.

MY ASSOCIATES and I will buy producing oil or gas properties. What have you? Brokers cooperate. Moss, 7733 Reading Road, Cincinnati 16, Ohio.

FOR SALE: Oil and Gas Leases and drilling propositions in shallow territory of Allen, Simpson, and Warren Counties, Kentucky. W. P. Harley, Bowling Green, Ky.

WILL BUY gas or oil production, large or small. Prefer properties with some undeveloped acreage. Might consider drilling deals. Box D-172, The Oil and Gas Journal, Tulsa, Okla.

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DEEDED ROYALTIES
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CASH for your producing royalties, no delay, quick action. Jack Eagle, 311 Tradesmen Bldg., Okla. City, Okla. 7-7027 or 9-0421.

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PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 418, 815-15th Street, N.W., Washington 5, D. C.

SERVICES

INSPECTION SERVICE

A group of experienced refinery inspectors are forming an independent inspection service to provide inspection service to refineries, gasoline plants, and to provide other inspection services required by customers. Proposed starting date of service to be January, 1950. Headquarters to be in Houston, Texas. If interested please write for details. Box D-217, The Oil and Gas Journal, Tulsa, Oklahoma.

N. Central Texas

(Continued from page 129)

Survey, flowed 6 bbl. of oil on preliminary tests. Location is a north offset to the Breneke sand discovery, 2 miles south of the town of Coleman. Details of the test were not disclosed.

In the same area, F. W. Burger 1 Sam Stanberry, W. H. King Survey 737, was reported dry at 2,470 ft. Top of the Gardner sand was 2,440 ft., with no shows.

South of the Coleman city limits, Earl Morris 1 Earl Morris, north of the Stepp and Maxwell operations, was drilling below 1,200 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Coleman County: K. C. Bates 1 J. A. Baker, Johann Faxell Sur. 83, 3 mi. SW Burkett, pumped 12 bbl. 41-gravity oil a day, pay 913-18 ft., TD 919 ft.

Erath County: Continental Oil Co. 1 C. H. Polk, G. West Sur., A-808, 3¼ mi. SW Huckaby, flowed 720,000 cu. ft. of gas a day, top gas 3,603 ft., TD 4,200 ft., Bend 3,691 ft., Mississippi 4,158 ft., Ellenburger 4,165 ft., elev. 1,444 ft.

Parker County: Roger B. Owings 1 T. B. Saunders, Hudson-Westbrook Sur., A-2474, 5 mi. SW Weatherford, flowed 4,400,000 cu. ft. of gas a day, perf. Mississippian 4,543-59 ft., shut-in pressure 1,898 psi., TD 6,509 ft.

Runnels County: Woods Drilling Co. 1 Carl Vogler, J. C. McKean Sur., 6 mi. SE Winters, pumped 125 bbl., 42-gravity oil a day, pay 2,349-65 ft., TD 2,366 ft.

Throckmorton County: Mudge Oil Co. 1 Ross Sloan "B," Sec. 914, TE&L Sur., 6 mi. SW Woodson and ¾ mile south of new Mississippian production, flowed 119 bbl. of 41-gravity oil a day, GOR 450 cu. ft., Mississippian 4,501-07 ft., TD.

Wise County: Signal Oil & Gas Co. et al 1 Daly Unit 4, SE SE J. Liles Sur., A-1172, 7 mi. NW Springtown, flowed 475 bbl. 38-gravity oil a day, 1-in. opening, top pay 3,906 ft., TD 4,082 ft., PB 4,062 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: W. J. and J. J. Moran 4 W. R. Hammond, H. Corzine Sur., A-56, 5 mi. W Scotland, dry, TD 2,497 ft.

W. J. and J. J. Moran 1 Hoffman, Lot 31, Blk. 3, Clark & Plumb Sur., 1½ mi. SW Scotland, dry, TD 5,401 ft.

Jack L. Storey 1 Ted Coleman, Blk. 22, Coleman Subd., Brazos CSL, A-18, 4 mi. N Scotland, dry, TD 4,906 ft.

Callahan County: Lebus & Sinex 2 Troy M. Allen, Sec. 19, BBB&C Sur., A-72, 6 mi. S Clyde, dry, TD 1,355 ft.

Coleman County: J. Lahroy Slusher 1 M. L. Boyd, H. R. Starkweather Sur. 266, 3 mi. NW Goldbush, dry, TD 1,411 ft.

Comanche County: United North & South Development Co. 1 C. R. Dudley, 23-2-ETRR Sur., 8 mi. S Comanche, dry, TD 4,000 ft., top lime 3,266 ft.

Clay County: H. D. Egger 1 Mrs. C. Brixey, Blk. 37, J. H. Belcher Subd., 1 mi. S Deer Creek, dry, TD 4,519 ft.

Cooke County: Kimball-Sims-Slemp 1 T. H. Clark, M. D. Lynch Sur., A-609, 2 mi. NW Burns City, dry, TD 2,625 ft.

William H. Rouzer 1 W. B. Hudspeth, T. Ramos Sur., A-861, 3 mi. NW Valley View, dry, TD 1,461 ft.

Wilcox Oil Co. et al 1 R. F. Frasher, Blk. 13, Hunt CSL, 5 mi. S Gainesville, dry, TD 2,115 ft.

Erath County: George Keith, Jr., 1 W. A. Bigby, J. R. Bancroft Sur., 6 mi. W Hannibal, dry, TD 236 ft.

J. D. Monk 1 O. W. McPherson, W. Chamberlain Sur., A-141, 10 mi. E Dublin, dry, TD 4,600 ft., Strawn sand 2,490 ft., top lime 4,200 ft., Ellenburger (?) 4,512 ft.

Haskell County: Lone Star Producing Co. 1 F. E. Walker, SE SE SE 210-45-H&TC, 3 mi. SE O'Brien, dry, TD 5,636 ft., Dotham 1,970 ft., Flippen 2,370 ft., Hope 2,540 ft., Strawn 4,848 ft., Caddo 5,548 ft., elev. 1,556 ft.

Jones County: S. C. Herring Drilling Co. 1 S. C. Ferguson, Sec. 137, BBB&C, 4 mi. NE Hamlin, dry, TD 3,420 ft., coal 2,831-33 ft., lime 2,846 ft.

Montague County: Gulf Oil Corp. 1 M. E. McDonald, W. Watson Sur., A-838, ½ mi. SW Belcherville, dry, TD 6,086 ft.

San Saba County: H. O. Newman 1 Mrs. Mary Weldon, H&TC Sur. 5, 6 mi. E Mercury, dry, TD 3,023 ft., Massive anhydrite 915-1,188 ft., Mississippian 1,213 ft., San Saba 2,228 ft., Hickory 2,655 ft., schist 2,960 ft., Oran 3,020 ft.

Stephens County: W. J. Gourley 1 Echels estate, 1-5-T&P, 5½ mi. N Caddo, dry, TD 4,425 ft., Caddo 3,108 ft., Mississippi 4,360 ft., elev. 1,140 ft.

Taylor County: Wells & Kennar 1 Houghs Boykin, J. Woodward Sur. 48, 4 mi. SW Abilene, dry, TD 2,395 ft.

Wichita County: L. E. Trout 1 Mary Taylor, J. Cole Sur. 838, A-37, 8½ mi. NE Electra, dry, TD 2,010 ft.

Young County: C. G. Butts 1 Dee Wilborn, Sec. 2446, TE&L Sur., 8 mi. W Olney, dry, TD 1,245 ft.

Consolidated Oil Co. 1 Bernice Long, Sec. 2707, TE&L Sur., 5 mi. S Loving, dry, TD 3,500 ft.

Shell Oil Co. 1 C. Wells, Sec. 731, TE&L Sur., A-736, 6 mi. SW New Castle, dry, TD 4,880 ft., Caddo 3,948 ft.

Permian Basin

(Continued from page 128)

Wallace, NE NW Sec. 88, Barbara Wall Sur., 13½ mi. NE Kermit, 1¼ mi. S outpost to Flying W field, dry, TD 11,855 ft., Yates 2,960 ft., Wolfcamp 8,170 ft., Devonian 9,640 ft., Simpson 10,820 ft., McKee 11,230 ft., Waddell 11,542 ft., Ellenburger 11,760 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Buffalo Oil Co. 3 Comanche Unit, 26-11s-26e, Chaves County wildcat, cored 6 ft. of dolomite, with some bleeding oil, at 6,061-67 ft., but recovered drilling mud and salt water on a drill-stem test at 6,013-67 ft. It cored additional dolomite and some chert, with slight bleeding oil, to 6,122 ft., then drill-stem tested at 6,081-6,122 ft., with the tool open 3 hours. Gas showed in 29 minutes producing a good blow throughout, and recovery was 217 ft. of mud plus 186 ft. of salt water. A 1½-hour test at 6,120-37 ft. recovered 15 ft. of drilling mud with no shows. At last report it was to be plugged back from 6,175 ft., total depth, to test a gas and distillate show at 5,935-50 ft.

One mile east of Stanolind Oil & Gas Co. 1-U State, discovery of House Devonian field, C. L. Norsworthy, Jr., 1 Shell-Waldrop, 6-20s-39e, flowed oil on two drill-stem tests, and showing for better production than the discovery.

Amerada Petroleum Corp. 1 Stella Bennett Rose, SE NW 35-16s-38e, prospective north extension to Knowles Devonian field, was running casing. Total depth was 12,5[illegible] ft. A 4½-hour drill-stem test from 12,560-597 ft. recovered water blanket and some 8,000 ft. of 45°-gravity oil. Flowing pressure was 4,200 psi. Devonian top was 12,547 ft. on an elevation of 3,705 ft.

SOUTHEAST NEW MEXICO SUCCESSFUL WILDCATS

Lea County: Amerada Petroleum Corp. 1-BTB State, NW NW 26-12s-33e, 4 mi. S 1-BTA, flowed 937 bbl. 59-gravity oil a day, ¼-in. choke, GOR 306 cu. ft., top Devonian pay 10,155 ft., TD 11,199 ft., PB 10,165 ft., elev. 4,259 ft.

Stanolind Oil & Gas Co. 1 Leonard-Federal, SE SE 11-26s-37e, flowed 24 bbl. 38-gravity oil in 24 hours through intermitter on 2-in. tubing, Devonian pay 9,410-9,530 ft., TD 12,065 ft., PB 9,530 ft., top Devonian 9,400 ft., Simpson 10,970 ft., McKee 11,385 ft., Ellenburger 11,948 ft., elev. 3,013 ft.

Oklahoma Fields

(Continued from page 120)

Aurora Gasoline Co. 1 Gragg, SE SW SE 19-12n-7e, a half mile west of the South Paden pool and about the same distance southeast of the one-well North Garden pool, in southwestern Okfuskee County, recovered 630 ft. of clean oil and 90 ft. of mud-cut oil in a drill-stem test of Red Fork sand at a total depth of 3,338 ft., and has run 5½-in. casing to 3,327 ft., the top, for completion. The sand is the equivalent of the Earlsboro sand, the productive zone of the Garden Grove pool to the south but the new well is separated from that pool by dry holes.

Claud Morgan and A. R. Jordon 1 Moorman, SE SE NW 31-18n-2e, a wildcat ¾ mile southeast of the North Coyle pool, Payne County, swabbed 50 to 100 bbl. per day after opening a Securaloy section in the casing string opposite Skinner sand at 4,330-60 ft.

A new producing area in Pennsylvanian sand has been opened south of the South Palacine pool in Stephens County by W. H. Atkinson and P. M. Harbour at their 2 R. L. Patty, NE NW SE 27-2s-6w, which has been completed on the pump for 19 bbl. per day. Sand is at 1,830-96 ft. with hole plugged back to the bottom of the sand from a total depth of 2,803 ft. The South Palacine pool produces from the Arbuckle detrital.

Garr-Wooley 1 Mercer, SW SW NE 20-3n-1e, a wildcat south of Vanoss, Okfuskee County, is being put on the pump. It is a "tight" hole and information has not been available, but the well is reported to have swabbed about 75 bbl. of oil per day. Total depth is approximately 2,000 ft., and about that much casing was run. Pay is believed to be the dolomite with perforations at approximately 1,790-1,805 ft.

OKLAHOMA WILDCAT FAILURES

Comanche County: Creel 1 Franklin, SW NW SW 22-2n-11w, dry, TD 873 ft.

Cotton County: Hart 1 Taliquechi, NW NE SE 1-3s-12w, dry, TD 1,932 ft.

Grimes 1 Thompson, SW SW NE 31-4s-9w, dry, TD 2,002 ft.

Garvin County: Sun 1 Cox, C SW SW 4-1n-1w, dry, TD 6,193 ft.

Harper County: Continental Oil Co. et al 1 Benton Ranch, SE NW SE 2-25n-22w, dry, TD 9,440 ft.

Hughes County: Armer 1 Powell, SE SE NW 36-9n-9e, dry, TD 3,384 ft.

Kiowa County: Ferguson 1 Mitchell, NW NW NW 12-6n-17w, dry, TD 850 ft.

LeFlore County: Miller 1 McGowan, NW NE SE 16-3n-22e, dry, TD 1,156 ft.

Love County: Hunt Oil 1 Stockbarger, SW SE SW 2-7s-3w, dry, TD 7,505 ft.

McClain County: Danciger 1 Ward, NW SE NW 2-7n-3w, dry, TD 9,422 ft.

McIntosh County: Flynn Oil Co. 1 Woods, NE NE NE 17-9n-15e, dry, TD 4,386 ft.

Payne County: Allen et al 1 Caldwell, SE SE NW 25-18n-2e, dry, TD 4,861 ft.

Pontotoc County: D. & D. Drilling Co. 1 Higdon-McAfee, E½ SW NW 7-4n-7e, dry, TD 1,987 ft.

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CALENDAR

September

National Association of Corrosion Engineers, West Texas Chapter, annual Permian basin corrosion tour, Midland, Tex., September 27-30.

American Society of Mechanical Engineers, fall meeting, Hotel Lawrence, Erie, Pa., September 27-30.

Colorado School of Mines, seventy-fifth anniversary observance, Golden, Colo., September 29-October 1.

October

Independent Petroleum Association of America, Texas Hotel, Fort Worth, October 2-4.

American Society of Mechanical Engineers, petroleum division, 1949 Petroleum Mechanical Engineering Conference, Biltmore Hotel, Oklahoma City, October 2-5.

National Association of Corrosion Engineers, South-Central Regional Division, annual meeting, Adolphus Hotel, Dallas, October 3-4.

National Lubrication Grease Institute, Hotel Roosevelt, New Orleans, La., October 3-5.

California Meter Association, twenty-second annual measurement and control-instrument exposition, Long Beach Auditorium, Long Beach, Calif., October 4-6.

American Institute of Mining and Metallurgical Engineers, Petroleum Branch, fall meeting, Plaza Hotel, San Antonio, October 5-7.

California Natural Gasoline Association, Ambassador Hotel, Los Angeles, October 7.

American Society for Testing Materials, Pacific area, national meeting, Hotel Fairmont, San Francisco, week of October 10.

American Association of Petroleum Geologists, regional meeting, Buena Vista Hotel, Biloxi, Miss., October 12-14.

Symposium on Instrumentation for the Process Industries, fourth annual session, School of Engineering, Texas A. & M. College, College Station, Tex., October 12-14.

Texas Mid-Continent Oil and Gas Association, annual meeting, Rice Hotel, Houston, October 13-14.

Natural Gasoline Association of America, Southern Regional Meeting, Tyler Texas, October 14.

Oil Progress Week, October 16-22.

American Gas Association, annual convention, Chicago, October 17-20.

American Institute of Mining and Metallurgical Engineers, Petroleum Branch, fall meeting, Elk's Club, Los Angeles, October 20-21.

Western Petroleum Refiners Association, regional technical meeting on waste-disposal problems, Palmer House, Chicago, October 21.

American Institute of Chemical Engineers, South Texas Section, annual meeting, Hotel Galvez, Galveston, October 21.

National Safety Congress, Morrison Hotel, Chicago, October 24-28.

National Conference on Industrial Hydraulics, fifth annual meeting, Sheraton Hotel, Chicago, October 26-27.

Independent Natural Gas Association of America, annual meeting, Baker Hotel, Dallas, October 31.

November

Society of Automotive Engineers, diesel, Chase Hotel, St. Louis, November 1-2.

Pacific Chemical Exposition, Civil Auditorium, San Francisco, November 1-5.

Society of Automotive Engineers, fuels and lubricants, Chase Hotel, St. Louis, November 3-4.

American Petroleum Institute, annual meeting, Stevens Hotel, Chicago, November 7-10.

Petroleum Electric Power Association, annual conference, Hotel Beaumont, Beaumont, Tex., November 17-18.

Society of Exploration Geophysicists, regional exploration meeting, Adolphus Hotel Dallas, November 17-18.

American Society of Mechanical Engineers, annual meeting, Hotel Statler, New York, November 27-December 2.

December

American Institute of Chemical Engineers, annual meeting, William Penn Hotel Pittsburgh, Pa., December 4-7.

Interstate Oil Compact Commission, annual meeting, Roosevelt Hotel, New Orleans, December 5-7.

NOMADS

Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

Canadian Fields

(Continued from page 123)

drill-stem test was run of the interval 4,029-44 ft. During that 75-minute test, there was a recovery of 90 ft. of clean oil and 60 ft. of mud cut with gas and oil. To date no formation water has shown. The well is being drilled by Pacific Petroleums Ltd., & Associates, on a farmout from Imperial Oil, Ltd. Recently Calahoo made a gas discovery in the Lower Cretaceous, rating a natural gas flow of 20,000,000 cu. ft. daily.

A new Edmonton-based independent, Oil City Petroleums, Ltd., is going to search for a southward extension of Leduc Oil City is starting to drill at its initial well, Oil City Petroleum 1 Leduc, in LSD 7, 21-49-26w4, about 1½ miles south of the Okalta Oils-Leduc group of producers.

More encouragement has been shown in the Volmer area, 15 miles northwest of Edmonton, where Imperial had drilled a well last year and obtained showings of oil, but was unable to make the hole into a commercial well. R. W. Development Co. of Calgary, a new independent, drilled a well, 1 R. W. Volmer, in LSD 7, 16-55-26w4, under a farmout agreement with Imperial, and is now testing the sand source, Lower Cretaceous, in attempts to place the well on production. During a 110-hour test period the well pumped 168 bbl. of 35° A.P.I. gravity crude oil, no water. Pump test is now continuing in efforts to evaluate the new well. The well, completed at 3,681 ft., and set 7-in. casing at bottom, gun-perforated from 3,670-76.5 ft. with approximately 65 shots prior to running pump tests.

Amerada Petroleum Corp. has obtained its tenth consecutive success on the section of Crown Reserve Lease that it acquired from the Alberta Government for 3½ million dollars. Amerada-Crown F24-16, LSD 3, 16-57-31w4, is the tenth completion, and is now waiting to establish initial potential. The ninth Amerada oil well, F43-16, rated a potential of 1,169 bbl. daily prior to acidization. Another two wells are now drilling, F33-16, drilling below 615 ft., and 34-16, drilling below 700 ft.

CANADIAN WILDCAT FAILURES

Emjay-South Brazeau No. 2, LSD 5, 29-42-21w4, TD 5,284 ft.

Royalite-Crowfoot No. 3, LSD 2, 9-20-19w4, TD 6,462 ft.

Imperial-Clairmont No. 1, LSD 16, 25-72-5w5, TD 11,710 ft.

Pacific Western-Sullivan Lake No. 1, LSD 4, 7-35-13w4, TD 4,253 ft.

Gulf E. Bauer No. 4, LSD 4, 34-37-20w4, TD 5,440 ft.

Midland-Texaco McColl No. 1, LSD 7, 11-53-1w5, TD 6,451 ft.

Royalite-Stony Plain No. 1, LSD 10, 12-52-26w4, TD 5,385 ft.

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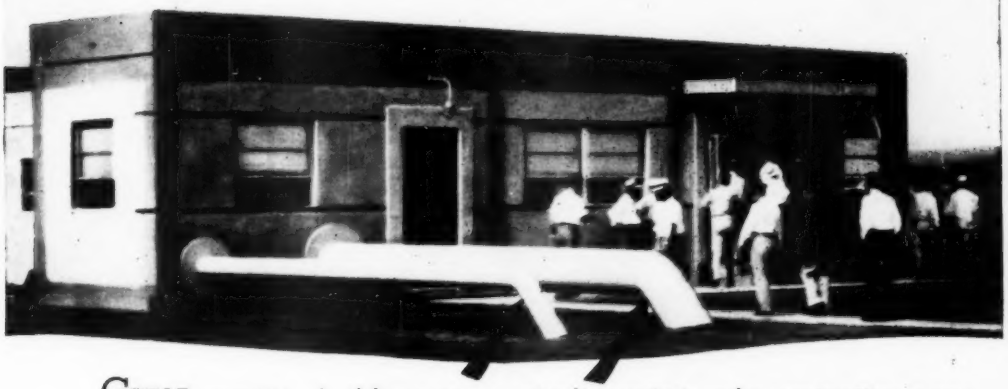

GREAT quantities of oil have gone through the pumps in the last 32 years--and there is a lot more to come. The above illustration shows a $10^{3}/_{4}$" line built in 1917 and its new companion 22" line in the Ozark system, terminating at Wood River, Ill. Line pipe for both these projects was furnished by Youngstown and we are proud to have played a part in the completion of the new as well as the old.

The Basin and Ozark system is the largest privately financed oil line ever constructed. Faith in the economic future of our country is represented by this venture. Many other pipe line projects under construction or contemplated reflect this same faith. In our present economy tomorrow's oil and tomorrow's gas are of increasing importance to all.

Youngstown line pipe means long lengths, ease of bending, ease of welding, speed in laying--the result of know-how developed in almost 50 years of pipe production. Remember, if it is Youngstown--it's good.

THE YOUNGSTOWN SHEET AND TUBE COMPANY General Offices — Youngstown 1, Ohio

Manufacturers of Carbon, Alloy and Yoloy Steel Export Office-500 Fifth Avenue, New York

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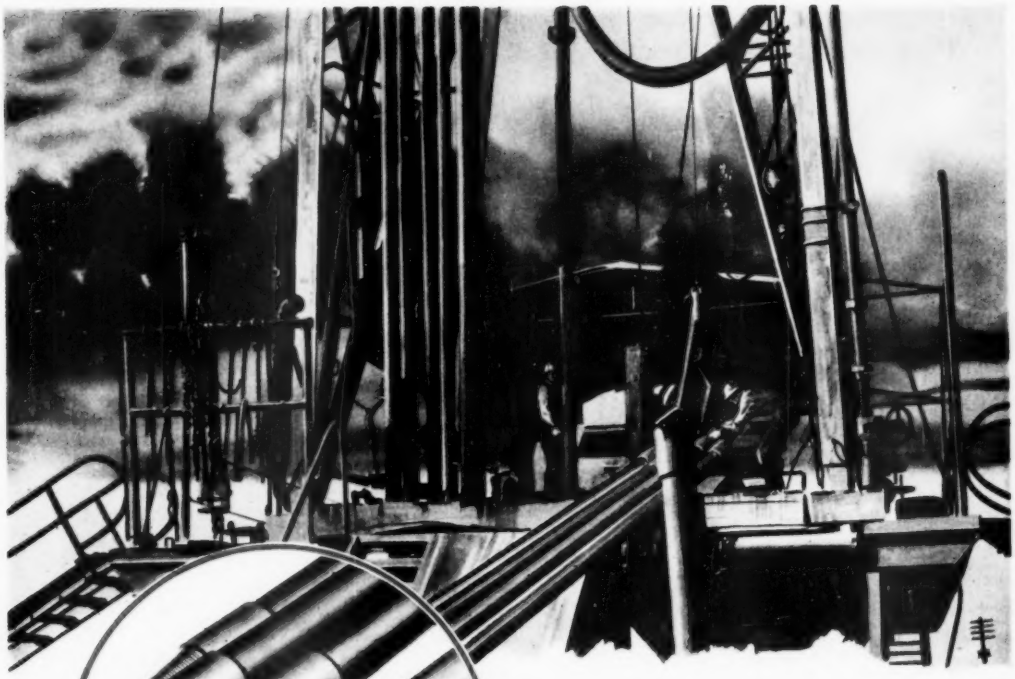

FOR DEPENDABILITY AND PERFORMANCE...

HUGHES SEAL GRIP TOOL JOINTS

Hughes Seal Grip Tool Joints . . . designed for maximum strength, safety, and complete utility as to field replacement . . . may be installed, removed, and replaced anywhere. A dependable seal at both ends of the Seal Grip thread provides:

1. Protection from corrosion for pipe and tool joints.
2. Added strength resulting from longer engagement.

The Seal Grip pipe end threads have shallow depth, coarse pitch, and steep taper. These features provide the following advantages:

1. Shallow depth threads permit the use of a minimum of the available section of pipe and tool joint for thread.
2. Coarse pitch threads are rugged and less susceptible to damage in installation and handling.
3. Steep taper permits a thicker tool joint section at the end of the pipe, providing a greater strength where the greatest loads occur.
4. Shallow depth, coarse pitch, and steep taper contribute to the reduction in the number of make-up turns required to assemble.

This is another Hughes "Engineered Solution."

HUGHES TOOL COMPANY

HOUSTON TEXAS

Standard of the Industry